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TABOAS NAUTICAS

De ordem de S. Ex.ª o Director Geral da Marinha

TABOAS

do Sr. 2.º tenente Sacro de Campos

PARA O

CALCULO DA HORA A BORDO

SEGUIDAS DE

TABOAS AUXILIARES

NOS

DIFFERENTES PROBLEMAS DA NAVEGAÇÃO

POR

J. E. LOPES BANHOS

Capitão de fragata da Marinha Portugueza

O archivista
Ant.º J. da Silva

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ALTERAÇÕES E CORRECÇÕES A ATTENDER

Pag.	Lin.	
V	5.ª	(contada da parte inferior da pagina). — Onde diz «caracteristica de do logarithmo» deve ser «caracteristica do logarithmo de».
XIII	–	No calculo d'esta pagina o logarithmo de 44°.04′ deve ser 1.1527 e não 1.1526, o que conduz ao erro, aliás sem importancia, de uma milha a menos na distancia que deve ser 33° 45′ = 2025 milhas.
XIII	–	A nota na parte inferior deve ser eliminada ou substituida por «veja-se a nota (*c*) no fim do Appendice».
XV	–	Na «Determinação de P′» onde diz «rumo inicial» deve dizer-se «rumo da partida (R′)».
XV	–	Nos dados para o calculo no fim da pagina a distancia é 57° 14′ = 3434 milhas, e não 343.
XV	–	Na penultima linha ha a addicionar NE. ou SW. a R′ = 38° 26′.
XVI	9.ª	Em vez de 46 34, deve ser 44 34.
XVI	23.ª	Em vez de 60 47, deve ser 69 47.
XIX	10.ª	Em vez de 17 43 47, deve ser 17 43 37.
XXX	–	No final do exemplo em vez de N 76° 5′ E, deve ser N 76, 5° E.
XXXIX	4.ª	Falta indicar a divisão de 4144 por 24.
1	–	O titulo Tabuas, deve ser Taboas.
16	–	No cruzamento de 71°, col. $\frac{\mu}{\delta\varepsilon}$ com 11′ faltam os tres primeiros algarismos que são 9.80.
108	–	Taboa 3). Os signaes indicativos ′ e ″ da primeira columna R devem ser trocados.
133	–	No cruzamento de P = 63 e θ = 15 em vez de 12° 26′ deve ser 13° 26′
210	3.ª	Onde diz «limbo inferior» é «limbo superior».
210	26.ª	Ao resultado «33° 16′ 34″» deve preceder a designação «Altura verdadeira».
211	13.ª	A indicação «(T. 21)» deve ser substituida por «(T. 22)».
216	24.ª / 25.ª	As designações «Æ» e «P» devem ser trocadas uma pela outra.
220	26.ª / 27.ª	Idem.

Observação Importante

Para elucidação completa dos Problemas tratados pelas *Taboas para o calculo da Hora* convem consultar as «Notas» no fim do «Appendice».

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Contém este livro o seguinte:

Taboas para a determinação da hora e mais calculos de bordo.

Taboas auxiliares para a solução do ponto estimado, correcções das alturas observadas dos astros e outros elementos dos calculos, determinação de circumstancias favoraveis de observação, latitude por alturas circummeridianas, variação do angulo no Polo para o erro de um minuto na latitude, nascer e pôr verdadeiro dos astros, amplitudes, etc., etc.

Taboas dos logarithmos dos numeros, linhas trigonometricas e valores dos senos naturaes.

Appendice — Exemplos de correcções de alturas observadas e determinação do ponto a bordo.

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PRELIMINARES

TABOAS PARA O CALCULO DA HORA

DISPOSIÇÃO E USO

Estas Taboas não são, nem podem ser, uma novidade scientifica.

São apenas o producto de uma das muitas transformações por onde póde passar a conhecida formula do angulo horario.

O seu fim é reduzir, tanto quanto possivel, o numero de operações, a que obriga o desenvolvimento da referida formula na determinação da hora a bordo, e por consequencia da longitude, facilitar o calculo, tornando-o mais expedito e rapido; e obter ao mesmo tempo, como resultados, valores sufficientemente approximados e acceitaveis para os usos ordinarios da navegação.

O seu caracter é pois accentuadamente practico.

Comparando-as com as taboas Martelli ou Johnson, producções da mesma natureza e para o mesmo fim, e que mais de perto foram examinadas, notam-se differenças sensiveis na construcção, não se reproduzindo nas presentes taboas alguns inconvenientes e deficiencias que aquellas apresentam, tendo além de tudo uma applicação mais extensa do que ellas.

Assim, as declinações vão além de 70°, circumstancia de grande importancia, quando se queira utilizar a observação de estrellas, cuja declinação seja superior áquelle numero, e são prevenidas varias hypotheses, que a practica constantemente apresenta, e que áquellas taboas esqueceram.

As presentes Taboas resolvem não só o problema da hora, para o qual foram expressamente construidas, mas tambem dão solução aos problemas que derivam do triangulo de posição nas suas relações entre quatro elementos (tres lados e um angulo).

Assim determinam ellas tambem a altura de um astro (reciproco do da hora), azimuth e declinação (reciproco), latitude por uma altura circummeridiana, e resolvem os problemas de navegação orthodromica, distancias lunares, variação do angulo no Polo por effeito do erro de um minuto na latitude, determinação de circumstancias favoraveis de observação (angulo horario e altura), calculo do coefficiente das circummeridianas, etc., etc.

As Taboas são tres: X, Y e Z, e tres são os logarithmos fornecidos por X e Y para o calculo da hora.

A somma d'esses logarithmos corresponde na Taboa Z um angulo em tempo ou em graus, etc.

Supprimiram-se tanto quanto possivel as caracteristicas. As da Taboa X, col. $\frac{\text{Lt.}}{\text{Dc.}}$, só apparecem de 60° em deante.

As da Taboa Y são exigidas nos logarithmos dos numeros de menos de quatro algarismos significativos. Em taes casos a caracteristica é egual a tantas unidades, quantos os algarismos que para o numero dado faltam para o complemento de 4. Assim a caracteristica de do logarithmo 0008 é 3, de 0083 é 2, de 0831 é 1.

Quando um logarithmo auxiliar tiver o indice ou caracteristica 9 ou 8, indica isso que o primeiro ou os dois primeiros algarismos do numero correspondente á parte decimal do logarithmo são unidades. Assim, para o logarithmo 8.1865, o numero correspondente é 65,09. E inversamente, logarithmo de 65,09 é 8.1865.

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As da Taboa Z estão notadas no alto e a meio das columnas, á esquerda dos logarithmos.

Quando o arco a entrar na Taboa X, col. D, exceder 90°, entra-se com o supplemento para 180°.

Quando os numeros entrados nas Taboas não se acham ahi exactamente, recorre-se, como é de uso sabido, ás interpolações, que se fazem á simples vista, e ao auxilio dos quadros das partes proporcionaes, como na Taboa Z.

I

Calculo da hora [1]

Elementos.... { Data.
Altura verdadeira.
Latitude estimada.
Declinação correcta para a hora do 1.° meridiano.

REGRAS

1.° Faz-se a differença entre latitude e declinação, se estes elementos são do mesmo nome, e a somma, se de nome contrario.

2.° Toma-se da Taboa X, col. A, o numero correspondente á altura, e da mesma taboa, col. D, o numero correspondente á differença ou somma de latitude e declinação.

Sommam-se os dois numeros, cuja somma se designa momentaneamente por *s*.

3.° Da mesma Taboa X, col. $\frac{\text{Lt.}}{\text{Dc.}}$, tomam-se os logarithmos da latitude e declinação, e da Taboa Y o logarithmo de *s*.

Sommam-se os tres logarithmos, e entra-se com o resultado na Taboa Z, que dará a hora ou o arco correspondente ao logarithmo entrado.

Nas observações a W. do meridiano, o angulo no polo e angulo horario são identicos, nas observações a E. este é o complemento d'aquelle para 24 horas ou 360°.

Angulo no polo e angulo horario serão respectivamente notados por P ou ℞ e ⅊.

O numero *s* excede frequentemente 10000.

É a parte excedente que se considera, e com a qual se entra na Taboa Y, para se tomar o logarithmo auxiliar, o que corresponde a abstrair na somma *s* do ultimo algarismo da esquerda, que é sempre 1.

EXEMPLOS

1.°

8 de outubro de 1890

Lat. estimada		40° 08′ 00″ S.	
Alt.ª verdadeira ⊙.....		17 56 41	(W. do Merid.°)
Decl. correcta		3 55 57	S.
A.....	17° 56′ 41″	1919	
Lt.....	40 08 00 S.		1844
Dc.....	3 55 57 S.		3000
D.....	36° 12′ 03″	3069	
log. aux. de...		4988	3021
			7865

⅊ = 4ʰ 39ᵐ 02ˢ

Este resultado é identico ao que se encontra na *Navegação de Norie*, de 1894, pag. 360. Escreveram-se 55 algarismos, Norie empregou 69.

[1] O primeiro meridiano escolhido é o de Greenwich; as ephemerides correspondentes o *Almanach Nautico Inglez*.

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2.°

5 de janeiro de 1890

Lat. estimada	18° 17′ 00″ N.		
Alt.ª verdadeira * (Procyon)	24 22 58		(W. do Merid.°)
Decl. correcta	5 30 22 N.		
A.	24° 22′ 58″	0872	
Lt.	18 17 00 N.		2785
Dc.	5 30 22 N.		2990
D.	12° 46′ 38″	4752	
log. aux. de...		5624	2500
			8275

$\text{AH} = 4^h\ 24^m\ 27^s$

O resultado é identico ao da citada obra de Norie, pag. 356. Escreveram-se 54 algarismos, Norie empregou 69.

3.°

24 de julho de 1890

Lat. estimada	34° 00′ S.		
Alt.ª verdadeira ⊙	33 50		(E. do Merid.°)
Decl. correcta	20 00 N.		
A.	33° 50′	9432	
Lt.	34 00 S.		2196
Dc.	20 00 N.		2740
D.	54° 00′	0878	
log. aux. de...		1)0310	1.5086
			2.0022

$24^h - \text{AH} = 1^h\ 04^m\ 52^s$
$\text{AH} = 22\ 55\ 08$

Tratando-se este exemplo pela formula de Borda, o resultado é identico ao obtido pelo presente processo.

4.°

28 de dezembro de 1890

Lat. estimada	54° 58′ 00″ N.		
Alt.ª verdadeira * (δ da Ursa menor)	55 01 00		(W. do Merid.°)
Decl. correcta	86 36 39 N.		
A.	55° 01′ 00″	6807	
Lt.	54 58 00		0600
Dc.	86 36 39		9.0727
D.	31° 38′ 39″	3513	
log. aux. de...		1)0320	1.4948
			0.6275

$\text{AH} = 5^h\ 46^m\ 56^s$

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5.º

2 de julho de 1890

Lat. estimada		6º 06′ S.	
Alt.ª verdadeira * (β² de Cepheu)		13 20	(E. do Merid.º)
Decl. correcta		70 06 N.	
A	13º 20′	2694	
Lt.	6 06 S.		2986
Dc.	70 06 N.		9.8330
D.	76º 12′	7385	
		1)0079	2.1024
			2.2340

24ʰ — ⅊ = 0ʰ 49ᵐ 39ˢ
⅊ = 23 10 21

Estes dois ultimos exemplos, tratados pela formula de Borda, dão resultado identicos aos já obtidos.

As taboas Johnson e Martelli não dão solução a estes dois problemas.

II

Calculo da altura

(Reciproco do da hora)

Elementos....
- Data.
- Latitude estimada.
- Angulo horario (deduzido da longitude).
- Declinação correcta para a hora do 1.º meridiano.

REGRAS

1.º Tomam-se da Taboa X os logarithmos da latitude e declinação, de que se faz a somma.

2.º Subtrahe-se esta somma do logarithmo da hora dado pela Taboa Z. O resultado é um logarithmo auxiliar, cujo numero correspondente se toma da Taboa Y.

3.º Subtrahe-se d'este numero o valor de D (differença ou somma de latitude e declinação), antecipadamente calculado (T. X., col. D).

4.º Com o resultado da subtracção entra-se na Taboa X, col. A, tomando d'ahi o numero de graus, minutos, etc., da altura que se pretende obter.

EXEMPLO

8 de outubro de 1890 (P. M.)

Lat. estimada	40º 08′ 00″ S.
Long. estimada	175 02 45 E.
H. do chronometro em 2	16ʰ 48ᵐ 00ˢ
Decl. correcta	3º 55′ 57″ S.
Equação do tempo	+ 10ᵐ 55ˢ

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Calculo do Angulo horario

H. m. Gr. em 2	16h 48m 00s
Long. (tempo)	11 40 11
H. m. b. em 3	4h 28m 11s
Eqt.	+ 10 55
AH	4h 39m 06s
log. AH	7864

Calculo da Altura

Lt.	40° 08′ 00″	S.	1844	
Dc.	3 55 57	S.	3000	
			4844	
		log. AH	7864	
		log. aux.	3020	4989
D.	36° 12′ 03″			3070
				1919

A = 17° 56′ 40″

III

Calculo do Azimuth

Elementos.... { Data.
Latitude estimada.
Altura verdadeira do Astro.
Declinação correcta.

REGRAS

São as mesmas que para o calculo da hora, com a differença da substituição spectiva dos elementos altura, declinação e angulo horario por declinação, altura azimuth.

Convem ainda assim accentuar, que se faz a differença entre latitude e altura uando a latitude e declinação são do mesmo nome, e somma, quando de nome ontrario.

A Taboa Z dá o azimuth verdadeiro, com o nome da declinação, e conta-se para E. ou W., quando a altura augmenta ou diminue.

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EXEMPLOS

1.º

20 de janeiro de 1890 (A. M.)

Lat. estimada		50º 42′ S.	
Alt.ª verdadeira ⊙		17 16	
Decl. correcta		20 06 S.	
Dc.	20º 06′ S.	1563	
Lt.	50 42 S.		1027
A.	17 16		2810
	33º 26′	3345	
log. aux. de...		4908	3091
			6928

z = S. 79º 08′ E.

Este resultado é identico ao que para o mesmo exemplo se encontra na *Navegação de Norie,* pag. 373. Escreveram-se 48 algarismos, Norie empregou 73.

2.º

31 de outubro de 1890 (P. M.)

Lat. estimada		34º 54′ 00″ N.	
Alt.ª verdadeira ⊙		24 12 26	
Decl. correcta		14 12 54 S.	
Dc.	14º 12′ 54″ S.	2544	
Lt.	34 54 00 N.		2149
A.	24 12 26		
	59º 06′ 26″	0134	
log. aux. de...		2678	5722
			1.0481

z = S. 50º 04′ W.

Este resultado é identico ao da citada obra de Norie, pag. 374. Escreveram-se 49 algarismos, Norie empregou 77.

IV

Calculo da Declinação

(Reciproco do do azimuth)

Elementos.... { Data.
Latitude estimada.
Altura verdadeira.
Azimuth verdadeiro.

Como, segundo as regras para o calculo do Azimuth, tem que ser considerado o signal da Declinação; evidentemente para o problema reciproco deve esta circumstancia ser previamente conhecida.

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O não se saber qual o referido signal, e, como consequencia, qual dos logarithmos deve intervir, se o do Azimuth, se o do seu supplemento para 180°, torna este problema pouco praticavel.

Entretanto, conhecidos os referidos elementos, as regras a seguir seriam as mesmas que para o calculo da Altura, substituindo respectivamente as denominações Altura, Declinação e Angulo horario por Declinação, Altura e Azimuth.

O Azimuth verdadeiro seria deduzido do da marcação, á qual se applicaria convenientemente a variação da agulha.

EXEMPLO

Lat. estimada	50° 42′ S.
Alt.ª verdadeira ⊙	17 16
Az. verdadeiro ⊙	S. 79 08 E.

Lt. S.	50° 42′	1027	
Alt.ª ⊙	17 16	2810	
		3837	
log. 79° 08′		6928	
Numero correspondente ao log. aux.		3091	4908
D.			3345
			1563

Dc. = 20° 06′ S.

V

Calculo da Latitude por uma Altura circummeridiana

(Reducção ao meridiano)

Elementos....
- Data.
- Latitude estimada.
- Altura verdadeira.
- Declinação correcta.
- Angulo no Polo (intervallo de tempo, a partir do meio dia).

REGRAS

Como se sabe, é condição indispensavel, para que o resultado do calculo possa convir, que o numero de minutos do angulo no Polo não exceda o numero de graus da distancia zenithal verdadeira.

1.° Tomam-se da Taboa X (col. $\frac{\text{Lt.}}{\text{Dc.}}$) os logarithmos da latitude e declinação. Sommam-se, e subtrahe-se a somma do logarithmo do angulo no Polo (Taboa Z).

2.° Entra-se na Taboa Y com o resultado, tomando d'ahi o numero correspondente ao logarithmo entrado; numero que se subtrahe do valor correspondente á altura, tomado da Taboa X, col. A.

3.° Com o resultado d'esta subtracção entra-se na mesma Taboa X, col. A, e toma-se a altura, de onde se deduz a distancia zenithal meridiana, a qual, applicada convenientemente á declinação, dá a latitude.

EXEMPLOS

1.º

22 de setembro de 1890 (P. M)

Lat. estimada	48° 43′ N.
Decl. correcta	0 12 N.
Ält.ª verdadeira ⊙	40 50 38″
⅄	0ʰ 33ᵐ 39ˢ

Lt.	48° 43′ N.	1204	
Dc.	0 12 N.	3010	
		4214	
	log. ⅄.	2.5703	
	log. aux.	2.1489	0071
	A.		8460
			8389
		41° 23′	
		48 37	
		0 12 N.	
	Lat.	48° 49′ N.	

A pag. 343 da *Navegação de Norie* encontra-se o resultado d'este calculo com todas as approximações em lat. 48° 49′ 03″ N.

2.º

16 de dezembro de 1890 (A. M.)

Lat. estimada	50° 47′ 00″ N.
Long. estimada	20 04 00 W. = 1ʰ 20ᵐ 16ˢ
Alt.ª verdadeira * Spica (α da Virgem)	27 59 30
Decl. correcta	10 33 30 S.
Hora media de Gr. em 15	20ʰ 22ᵐ 04ˢ

Angulo no Polo

H. m. Gr. em 15	20ʰ 22ᵐ 04ˢ
Long.	1 20 16
H. m. b.	19ʰ 01ᵐ 48ˢ
H. S. Gr. (A. N.)	17 36 22
Acc. (A. N.)	3 21
H. S. b.	12ʰ 41ᵐ 31ˢ
* ♈	13 19 25
* ⅄	37ᵐ 54ˢ E.

Lt.	50° 47′ 00″ N.	1019	
Dc.	10 35 30 S.	2935	
		3954	
	log. ⅄.	2.4672	
	log. aux.	2.0718	0085
	A.		0307
			0222
		28° 32′ 30″	
		61 27 30	
		10 35 30 S.	
	Lat.	50° 52′ 00″ N.	

O resultado d'este problema na *Navegação de Norie*, pag. 343, é, com todas as roximações, lat. 50° 51′ 57″ N.

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VI

Calcular a Distancia orthodromica entre dois pontos de um arco de circulo maximo, conhecidas as suas coordenadas geographicas

REGRAS

1.º Tomam-se da Taboa X, col. $\frac{\text{Lt.}}{\text{Dc.}}$ os logarithmos das latitutes, e sommam-se.

2.º Subtrahe-se a somma do logarithmo da differença de longitudes, tomado na Taboa Z.

O resultado é um logarithmo auxiliar, cujo numero correspondente, tomado na Taboa Y, se subtrahe do valor correspondente á differença ou somma de latitudes, quando do mesmo nome ou de nome contrario, tomado na Taboa X, col. D.

3.º Entra-se com o resultado na mesma Taboa X, col. D, e toma-se d'ahi o correspondente angulo ou arco que, convertido em milhas, dá a distancia pedida[1].

EXEMPLO

Determinar a Distancia orthodromica entre o cabo de S. Vicente e o cabo Race

Cabo S. Vicente		Cabo Race	
Lt.	37° 00′ N.	Lt.	46° 40′ N.
Lg.	9 00 W.	Lg.	53 04 W.

Diff. long. 44° 04′

Lt.	37° 00′ N.		2034	
Lt.	46 40 N.		1375	
			3409	
		log. 44° 04′	1.1527	
		log. aux...	8118	1542
	9° 40′			4858
				3316

D = 33° 44′ = 2024 milhas

VII

Dada a Distancia orthodromica entre dois pontos de que se conhecem as coordenadas geographicas, calcular o Rumo inicial ou da partida

REGRAS

1.º Faz-se a differença entre 90° e a distancia, e em seguida a differença ou somma d'aquella differença com a latitude de partida, se a distancia for menor ou maior que 90° nas latitudes extremas do mesmo nome, e a mesma differença ou somma,

[1] Quando a distancia de longitudes é maior que 90°, do numero tomado na Taboa Y subtrahe-se o valor correspondente á somma ou differença, e o angulo dado pela taboa é o supplemento da distancia que se procura.

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quando a distancia for maior ou menor que 90° nas latitudes extremas de nomes differentes.

Chama-se ao resultado *d*.

2.° Toma-se da Taboa X, col. A, o numero correspondente á latitude de chegada, e da col. D o correspondente a *d*. Faz-se a somma dos dois numeros que se designará por *s*.

3.° Da Taboa X, col. $\frac{\text{Lt.}}{\text{Dc.}}$, tome-se o logarithmo da differença entre 90° e a distancia, e o da latitude de partida; e da Taboa Y o logarithmo de *s*.

Sommam-se os tres logarithmos, e entra-se com o resultado na Taboa Z, que dará o angulo correspondente ao rumo.

EXEMPLO

Cabo S. Vicente		Cabo Race	
Lat.....	37° 00′ N.	Lt.....	46° 40′ N.
Long..... ..	9 00 W.	Lg.....	53 04 W.

D = 33° 44′
90 — D = 56 16

Lat. chg.	46° 40′	7726	
90 — D.....	56 16		0456
Lat. p.	37 00		2034
d.....	19 16	4440	
s.		2166	6643
			9133

R = 59° 13′ NW.

VIII

Calculo das Coordenadas dos differentes pontos de um arco de circulo maximo, conhecidas as Coordenadas geographicas dos pontos extremos e o Rumo inicial (R)

Consiste o problema em determinar:

1.° θ, angulo de intersecção do referido arco com o equador.

2.° R′, rumo terminal ou no ponto de chegada.

3.° P′, differença de longitudes entre o ponto de partida e o ponto de intersecção.

Para esta definição é considerado ponto de partida o mais proximo do equador, quando as latitudes extremas são do mesmo nome, e o mais afastado quando de nome contrario.

4.° φ Latitudes dos differentes pontos do arco.

Para esta determinação considera-se como variavel a longitude.

Procede-se da seguinte maneira:

Arbitram-se grandezas successivas (*p*), que, combinadas com a longitude de partida, dêem as longitudes intermedias.

Com o conhecimento de P′ determina-se em seguida P, angulo no Polo ou differença entre o meridiano da partida e o do ponto para o qual se vae calcular a latitude.

P será pois egual a $p \pm P'$, segundo que as latitudes extremas do arco são do mesmo nome ou de nome contrario.

Na differença entre P′ e *p*, quando *p* for maior que P′, a latitude a calcular é de nome differente do da latitude da partida.

Feita a somma ou differença, determina-se em seguida o rumo (*r*) e a latitude (φ), correspondentes á longitude arbitrada.

Convém notar que o ponto de intersecção do arco com o equador está dentro

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do arco, quando as latitudes extremas teem nomes differentes, e fóra, nas latitudes do mesmo nome.

θ é tambem egual á latitude do vertice do circulo maximo, que é o ponto de maior distancia ao equador.

$90^\circ - \theta$ é egual ao rumo no ponto de intersecção.

N'este problema apenas se faz uso da Taboa X, col. $\frac{\text{Lt.}}{\text{Dc.}}$.

REGRAS

Determinação de θ

Sommam-se os logarithmos da latitude da partida e complemento do rumo inicial. Subtrahe-se da somma o logarithmo de 0° (3010). O angulo da taboa correspondente ao resultado é θ.

Determinação de R'

Subtrahe-se do logarithmo de θ o da latitude da chegada, e junta-se á differença 3010. Ao resultado corresponde na taboa $90^\circ - R'$.

Determinação de P'

Subtrahe-se do logarithmo do rumo inicial o logarithmo de $90^\circ - \theta$, e junta-se á differença 3010. O angulo da taboa correspondente ao resultado é P'.

Determinação de r e φ

Determinado P, somma-se o seu logarithmo com o de $90^\circ - \theta$, subtrahindo ao resultado 3010. Entrando na taboa, esta dá r.

Do logarithmo de θ subtrahe-se o logarithmo de $90 - r$, e junta-se 3010. O angulo respectivo da taboa é φ.

Distancia do ponto de intersecção a cada um dos pontos do arco

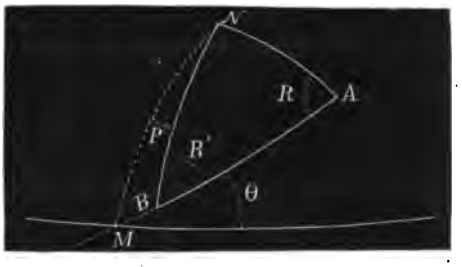
Sommam-se os logarithmos de φ e P, subtrahindo á somma 3010, o que corresponde no exemplo seguinte a fazer a somma dos logarithmos já calculados α e β.

Obtidos estes elementos, determinam-se as distancias entre os pontos.

EXEMPLOS

(A) 8 milhas ao S. de Lizard.... { Lat. 49° 50' N. / Long. 5 12 W.

(B) 5 milhas a E. de Barbados... { Lat. 13 06 N. / Long. 59 20 W.



Diff. long..... 54° 08'
Distancia..... 57 14 = 343 milhas
Rumo inicial (R) = 69 50 SW.

θ		R'		P'	
log. Lat. (A).....	1106	log. θ.....	0831	log. R'.....	1950
log. $90^\circ - R$.....	2735	log. Lat. (B).....	2896	log. $90^\circ - \theta$.....	2018
	3841		9.7935		9.9932
log. θ.....	0831	log. $90^\circ - R'$.....	0945	log. P'.....	2942
$\theta = 52^\circ 44'$		$90^\circ - R' = 51^\circ 34'$		$P' = 10^\circ 08'$	
$90^\circ - \theta = 37\ 16$		$R' = 38\ 26$			
log. $90^\circ - \theta$.. 2018		log. R'.. 1950			

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r e φ

p = 9°	p = 18°	p = 27°
p′ = 10 08′	10 08′	10 08′
log. 19° 08′ 2764.... (α)	28° 08′ 2464..... (α)	37° 08′ 2026..... (α)
log. 90 — θ 2018	2018	2018
4782	4482	4044
log. r 1772	1472	1034
r = 41° 15′ SW.	45° 26′ SW.	50° 37′ SW.
90° — r = 48 45 1201	46 34 1538	39 23 1892
log. θ..... 0831	0831	0831
(β)... 9.9630	(β)... 9.9293	(β)... 9.8939
2640	2303	1949
λ = 50° 20′ W. φ = 23° 19′ N.	λ = 41° 20′ W. φ = 31° 49′ N.	λ = 32° 20′ W. φ = 38° 27′ N.
2764	2464	2026
9.9630	9.9293	9.8939
0.2394 29° 48′	0.1757 41° 28′	0965 51° 21′

p = 36°	p = 45°	p = 54° 08′
10 08′	10 08′	10 08
46° 08′ 1418..... (α)	55° 08′ 0582..... (α)	64° 16′ 9.9387.... (α)
2018	2018	2018
3436	2600	1405
0426	9.9590	9.8395
56° 32′ SW.	62° 56′ SW.	60° 47′ SW.
33 28 2223	27 04 2506	20 13 2734
0831	0831	0831
(β)... 9.8608	(β)... 9.8325	(β)... 9.8097
1618	1335	1107
λ = 23° 20′ W. φ = 43° 28′ N.	λ = 14° 20′ W. φ = 47° 09′ N.	λ = 5° 12′ W. φ = 49° 49′ N.
1418	0582	9.9387
9.8608	9.8325	9.8097
0026 59° 48′	9.8907 67° 08′	9.7484 73° 44′

As distancias do ponto de intersecção ao ponto de partida e mais pontos são:

73° 44′, 67° 08′, 59° 48′, 51° 21′, 41° 28′, 29° 48′

e as distancias de ponto a ponto, a começar de A, são:

6° 36′, 7° 20′, 8° 27′, 9° 53′, 11° 40′, 13° 18′

que facilmente se reduzem a milhas.

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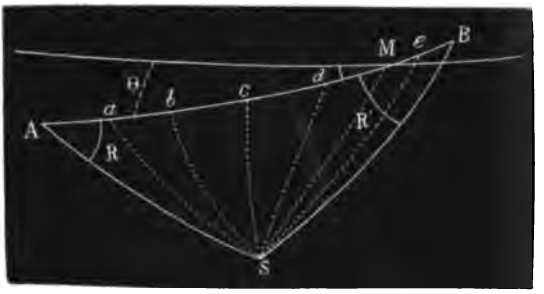
(A) Otago (Nova Zelandia) { Lat. 45° 47′ S. / Long. 170 45 E.
(B) Panamá..... { Lat. 8 57 N. / Long. 79 31 W.

Diff. long. ..... 109° 44′

Distancia 110 08

R = 97° 59′ 30″ SW. = 82° 00′ 30″ SE.



O seguinte quadro dá os resultados obtidos, seguindo as regras indicadas.

θ = 46° 19′ R′ = 44° 21′ SW. P′ = 101° 05′

Pontos do arco	p	P	λ	r	φ	Distancia de M a	Distancia entre os pontos
A	0°	101° 05′	170° 45′ E.	82° 00′ SE.	45° 47′ S.	A 97° 42′	13° 53′
a	20	81 05	169 15 W.	83 34 NE.	45 58 »	a 83 49	14 42
b	40	61 05	149 15 »	69 32 »	42 30 »	b 69 07	17 30
c	60	41 05	129 15 »	56 58 »	34 32 »	c 51 37	22 27
d	80	21 05	109 15 »	47 34 »	20 38 »	d 29 10	29 10
M	101 05′	0 00	88 10 »	43 41 »	0 00 »	M 0 00	4 32
e	104	3 05	85 11 »	43 46 »	3 20 N.	e 4 32	7 54
B	109 44	8 39	79 31 »	44 21 »	8 57 »	B 12 26	

N. B. — Quando, como acontece n'este exemplo, o arco a entrar na taboa é superior a 90°, entra-se com o supplemento para 180°, e o logarithmo final, resultado da somma ou differença, é o logarithmo de um arco supplementar.

IX

Distancias lunares

(Methodo approximado)

Alturas e distancia apparente

Para as referir ao centro, corrigem-se:

O Sol, da depressão e semi-diametro.

A Lua, da depressão, e semi-diametro, correcto para a hora do 1.º meridiano (Greenwich), e por effeito do augmento.

Qualquer outro planeta, da depressão e semi-diametro.

As estrellas, da depressão.

Para a distancia apparente, junta-se á observada os semi-diametros do Sol e da Lua, quando o Sol é um dos astros da distancia.

Se for estrella ou planeta, junta-se ou subtrahe-se o semi-diametro da Lua, segundo que a distancia á estrella foi tomada do bordo mais proximo ou mais afastado da Lua.

Para se passar das alturas apparentes á verdadeira, tem que se levar em conta as seguintes correcções a mais:

Para o Sol e qualquer planeta, incluindo a Lua, refracção e parallaxe em altura.

Para estrellas, refracção.

Para passar da parallaxe horizontal da Lua á parallaxe em altura, tem aquella

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que sér correcta para a hora de Greenwich, applicando-se-lhe em seguida a correcção devida á latitude (achatamento da terra).

Applicadas estas correcções, a conversão em parallaxe em altura faz-se do seguinte modo:

1.º Reduz-se a parallaxe correcta a segundos, e toma-se o logarithmo correspondente (Taboa Y).

2.º Acha-se o logarithmo da altura, referida ao centro (Taboa X, col. $\frac{\text{Lt.}}{\text{Dc.}}$).

3.º Subtrahe-se este segundo logarithmo do primeiro, e procura-se na Taboa Y o numero correspondente á differença, numero que, dividido por 2, dá os segundos da parallaxe em altura.

Seja A = 21° 23′ e P. H = 60′ 17″ = 3617″

log. 3617	4416	
log. 21° 23′	2701	
log. aux.	1715	6737
		3368″ = 56′ 8″

Distancia verdadeira

A distancia verdadeira acha-se, applicando á apparente duas correcções, uma determinada pelo calculo, outra fornecida pela taboa auxiliar 20.

A primeira correcção é resultado de duas outras correcções, que se chamam correcção da distancia da Lua ou, referida á Lua, correcção da distancia do Sol, planeta ou estrella.

São estas duas correcções parciaes que se vão determinar, e as regras a seguir para uma applicam-se de um modo analogo á outra.

As regras são:

1.º Somma-se a altura apparente da Lua com a co-distancia, ou subtrahe-se uma da outra, segundo que a distancia fôr maior ou menor que 90°. Chama-se a esta somma ou differença *d*.

2.º Toma-se da Taboa X (col. A e D) os valores correspondentes á altura verdadeira do Sol e á somma ou differença *d*, dos quaes se fará a somma que, por simplificação, se chamará *s*.

3.º Reduz-se a segundos a correcção da altura da Lua (differença entre a altura verdadeira e a apparente), e tomam-se os seguintes logarithmos: da Taboa X, col. $\frac{\text{Lt.}}{\text{Dc.}}$ altura apparente da Lua e co-distancia apparente; da Taboa Y, logarithmo de *s* e correcção da altura da Lua.

Sommam-se estes quatro logarithmos.

4.º Entra-se com esta somma na mesma Taboa Y, e levando-se em conta a caracteristica, toma-se o numero correspondente, que se multiplica por 4.

O resultado será minutos e segundos ou só segundos, que se subtrahirão da correcção da altura da Lua.

Esta é a primeira das correcções parciaes.

De uma maneira analoga se acha a outra correcção, e as regras são as já enunciadas, com a simples troca da palavra Lua por Sol, estrella ou planeta, e vice-versa.

Subtrahindo as duas correcções parciaes, a differença será a primeira correcção a applicar á distancia apparente, a qual se subtrahe d'esta.

A segunda correcção é dada, como já se disse, pela taboa auxiliar 20.

Nos exemplos adopta-se para notações A, A′, D e D′ para designar alturas e distancias verdadeiras e apparentes.

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EXEMPLOS

1.º

D′	90º 13′ 59″	
A ☉	17 26 47	— 2′ 51″
A′ ☉	17 29 38	
A ☾	56 17 29	+ 32′ 26″
A′ ☾	55 45 03	

A ☉	17º 26′ 47″	2002		A ☾	56º 17′ 29″	6681	
A ☾	55 45 03		0514	A′ ☉	17 29 38		2805
Co-D′	00 13 59		3010	Co-D′	00 13 59		3010
....	55º 59′ 02″	0594			17º 43′ 47″	4525	
		2596	5857			1206	9185
	32′ 26″	1946	7109		2′ 51″	0171	1.7670
			1.6490				3.2670
			0224				0005.4
			4				4
			896 =	14′ 56″			21.6
				32 26			22″
				17′ 30″			2′ 51
							2′ 29″

	17′ 30″
	2 29
	15′ 01″

D′....	90º 13′ 59″
1.ª correcção	— 15 01
	89º 58′ 58″
2.ª correcção	00 00
D	89º 58′ 58″

O resultado d'este calculo, dado por Norie na sua Navegação de 1894, pag. 413, e calculado pela formula de Borda, differe do resultado acima em um segundo.

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2.º

Novembro 20 de 1890 pelas 7 horas e 52 minutos (P. M.)

Lat. estimada.....	40º 06′	N.
Long. estimada (1).....	135 20	E.
H. do chronom. correcta	22h 35m 44s	
D'....	51º 42′ 44″	
A ✱ (Athair)	30 30 24	— 1′ 37″
A′ ✱	30 32 01	
A ☾	36 29 06	+ 46′ 37″
A′ ☾	35 42 29	

A ✱	30º 32′ 24″	9924		A ☾	36º 29′ 06″	9054	
A′ ☾	35 42 29		2106	A′ ✱	30 32 01		2362
Co-D′	38 17 16		1959	Co-D′	38 17 16		1959
	2º 34′ 47″	4990			7º 45′ 15″	4909	
		4914	3086			3963	4020
	46′ 37″	2977	5533		1′ 37″	0097	2.0132
			1.2684				2.8473
			0539				0014.2
			4				4
			2156 = 35′ 56″				56.8
			46 37				57″
			10′ 41″				97
							40″
					10′ 41″		
					40		
				1.ª correcção	10′ 01″		

D′....	51º 42′ 44″
1.ª correcção....	— 10 01
	51º 32′ 43″
2.ª correcção....	+ 13
D....	51º 32′ 56″

Este resultado é identico ao dado pela *Navegação de Norie,* pag. 419, e deduzido pela formula de Borda.

(1) A hora de bordo e a longitude estimada mostram que a data em Greenwich é novembro 19, 22 horas

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3.º

Junho 25 de 1890 pelas 10 horas (P. M.)

Lat. estimada	15º 42′	N.
Long. estimada	62 30	E.
H. do chronom. correcta	5ʰ 47ᵐ 56ˢ	
D′	53º 40′ 18″	
A ☉	50 47 12	— 0′ 34′
A′ ☉	50 47 46	
A ☾	32 59 16	+ 45′ 30″
A′ ☾	32 13 46	

A ☉	50º 47′ 12″	7275		A ☾	32º 59′ 16″	9556	
A′ ☾	32 13 46		2283	A′ ☉	50 47 46		1017
Co-D′	36 19 42		2071	Co-D′	36 19 42		2071
	4º 05′ 56″	4974			14º 28′ 04″	4683	
		2226	6525			4239	3727
	45′ 30″	2730	5638		34″	0034	2.4685
			1.6517				3.1500
			0223				0007
			4				4
			892″ =	14′ 52″			28″
				45 30			34
				30′ 38″			6″
					30′ 38″		
					6		
				1.ª correcção	30′ 32″		

D′....	53º 40′ 18″
1.ª correcção....	— 30 32
	53º 09′ 46″
2.ª correcção....	+ 6
D....	53º 09′ 52″

Este resultado é identico ao da Navegação de Norie, pag. 425, deduzido pela formula de Borda.

Completa o problema das distancias lunares a determinação da hora media do 1.º meridiano (Greenwich), correspondente á distancia calculada, para o que tem que se recorrer ao Almanach Nautico, nas pag. XIII a XVIII de cada mez, onde em cada dia, e de tres em tres horas (tempo medio de Greenwich), se encontram varias distancias do Sol, planetas e estrellas ao centro da Lua, e onde entre duas d'ellas está comprehendida a distancia calculada.

REGRAS

1.º Toma-se a differença entre a distancia verdadeira calculada e a mais proxima do Almanach, precedendo aquella na ordem das horas do mesmo Almanach[1], e calcula-se o logarithmo proporcional d'essa differença.

[1] Entra-se no Almanach com a data astronomica de Greenwich (T. M.), e toma-se a distancia correspondente á hora que preceda a do chronometro.

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2.º Subtrahe-se esse logarithmo do logarithmo proporcional do almanach, collocado á direita da distancia tomada, e na mesma linha (col. P. L. *of diff.*)

O resultado é o logarithmo proporcional do intervallo de tempo a juntar á hora do Almanach, correspondente a essa distancia.

3.º Achado o intervallo, somma-se este com a referida hora; sendo esta somma a hora media approximada de Greenwich.

Mas, como as distancias lunares não variam n'um intervallo de tres horas proporcionalmente aos tempos, devido á irregularidade do movimento da Lua, torna-se necessario corrigir a hora approximada da variação das differenças das distancias; para isso:

4.º Tomam-se as differenças entre o logarithmo proporcional ao lado da distancia, e os logarithmos proporcionaes á esquerda e á direita na mesma linha, e faz-se a media d'essas differenças.

5.º Com o intervallo de tempo com que se calculou a hora approximada e a media das differenças como argumento, entra-se na taboa do Almanach *The correction for second differences,* onde no respectivo cruzamento se encontrará a correcção a juntar á hora approximada, se os logarithmos proporcionaes decrescerem, e a subtrahir, se crescerem. O resultado é a hora media de Greenwich.

A omissão d'esta correcção produz um erro de 3′ na longitude.

Se acontece que a differença media dos logarithmos proporcionaes excede os limites da taboa, os argumentos serão: o intervallo de tempo, e uma fracção da differença, augmentando-se depois a correcção na relação da fracção escolhida.

A omissão da correcção póde produzir um erro de 11.5′ na longitude.

Applicando as regras acima aos dois ultimos problemas, acha-se

2.º EXEMPLO

20 de novembro de 1890 (19,22 horas)

D	51° 32′ 56″				
D (A. N.)	50 52 40	3746	19	21ʰ 00ᵐ 00ˢ	
(¹)	40′ 16″	6503			
		2757		1 35 24	
3819 3746 3678	73 68	70	H. approx. Gr.	22ʰ 35ᵐ 24ˢ	
			Correcção....	+ 22	
			H. m. Gr.	22ʰ 35ᵐ 46ˢ	

(¹) Para calcular o logarithmo proporcional de qualquer intervallo de tempo, observem-se as seguintes regras:
1.º Reduzir a minutos e decimos de minuto o intervallo, e procurar o log. auxiliar (Taboa Y);
2.º Subtrahir d'este logarithmo a constante 1.7447.

EXEMPLO

$0^h\ 40^m\ 16^s = 40.27^m$

log. aux. 40.27^m.....	2.3950
Constante.....	1.7447
	0.6503

E inversamente, se se quizesse determinar o intervallo de tempo que deu origem ao logarithmo proporcional, sommar-se-ia a constante 1.7447 com o logarithmo proporcional, procurando em seguida o numero correspondente ao logarithmo da somma, e reduzil-o depois a tempo.

EXEMPLO

log. prop.....	0.2757	
Constante.....	1.7447	
log. aux.....	2.0204	$95.4^m = 1^h\ 35^m\ 24^s$

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3.º EXEMPLO

25 de junho de 1890 (5^h 48^m)

D		53° 09′ 52″			
D (A. N.)		54 36 58	2850	25	3^h 00^m 00^s
		1° 27′ 06″	3153		
			0303		2 47 52
2861	11		H. approx. Gr.		5^h 47^m 52^s
2850	12	11	Correcção....		+ 1
2858			H. m. Gr.....		5^h 47^m 53^s

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TABOAS AUXILIARES

DISPOSIÇÃO E USO

Taboa 1) Estima

Serve em geral esta taboa para a determinação dos valores dos elementos de um triangulo rectilineo rectangulo, conhecidos dois d'esses elementos, e em especial para a solução dos problemas da navegação pela estima.

A hypothenusa do triangulo será designada por distancia, os lados do angulo recto por differença de latitudes e apartamento, e um dos angulos agudos será o rumo.

As distancias estão marcadas no alto da taboa, bem como as differenças de latitude e apartamento para os rumos de 1° a 45° que se lêem na columna da esquerda de cima para baixo. Para os rumos de 45° a 89°, que se lêem na columna da direita de baixo para cima, estão designadas as distancias na parte inferior da taboa, e bem assim as differenças de latitude e apartamento.

Os casos mais frequentes do uso da taboa são:

1.° Dado o rumo e distancia, achar a differença de latitudes e apartamento.

No cruzamento da linha do rumo com a columna da distancia acham-se os elementos que se procuram.

EXEMPLO

Rumo 30° e distancia 276′
Diff. de latitudes = 239.0
Apartamento . . . = 138.0

2.° Dada a latitude media e apartamento, achar a differença de longitudes.

A latitude media, ou media das latitudes de partida e chegada, é considerada como rumo, e o apartamento como differença de latitudes.

No cruzamento da linha do rumo com a columna de latitudes que contém o dado apartamento, leia-se na parte superior ou inferior da columna o numero indicativo da distancia, que será a differença de longitudes.

EXEMPLO

Latitude media . . .	34°
Apartamento	173.3
Diff. de longitudes	209

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Taboa 2) Factor da distancia

Substitue esta taboa a Taboa 1 no problema usual de, dado o rumo e distancia, achar a differença de latitudes e apartamento.

A cada rumo correspondem dois numeros, um, o factor para a differença de latitudes, o outro, factor para o apartamento.

Cada um d'estes numeros multiplicado pela distancia dá a differença de latitudes e o apartamento.

EXEMPLO

Seja o rumo 30° e a distancia 276.

A 30° correspondem 0.886 e 0.500, que, multiplicados cada um por 276, dão:

Diff. de latitudes..	239.02
Apartamento.....	138.0

Esta taboa convem principalmente quando se deseje levar a uma grande approximação os valores das differenças de latitudes e apartamento.

Taboa 2-a) Factor do apartamento

Esta taboa, de construcção analoga á da taboa anterior, fornece para uma dada latitude media um numero que, multiplicado pelo apartamento, dá a differença de longitudes, que póde ser mais ou menos approximada, se do numero se aproveitam todos ou parte dos algarismos.

EXEMPLO

Seja a latitude media 34° e apartamento 173.3.

A 34° corresponde 1.206 que, multiplicado por 173.3, dá:

Diff. de longitudes	208.99

Taboa 3) Refracção media

Dá esta taboa em minutos e segundos a refracção media dos corpos celestes, correspondente ao estado medio da atmosphera (barom. 760 mill. e therm. cent. + 10°).

EXEMPLO

Para 24° 10′ de altura apparente a refracção é 2′ 9″.

Esta correcção é sempre subtractiva.

Taboa 4) Depressão

Esta taboa dá em minutos e segundos a depressão apparente do horizonte do mar, variavel segundo a elevação do observador.

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Assim, a depressão para 8 metros de elevação é 5′ 01″.
Esta correcção é sempre subtractiva.

N. B. — Sempre que n'este livro se fizer referencia á elevação do observador, ou nas taboas fôr indicado como argumento a elevação, subentende-se sempre a distancia medida na vertical do olho do observador ao nivel do mar.

Taboa 5) Depressão a differentes distancias do observador

Emprega-se esta taboa, quando a vertical de um astro, cuja altura se observa, encontra a terra, achando-se esta distante do observador a menos de cinco ou seis milhas.

Esta correcção é deduzida de uma formula composta de dois termos, o primeiro dependente da distancia, e o segundo da distancia e da elevação do observador.

Assim, para se obter a depressão a uma dada distancia, toma-se da columna «1.º termo» o numero correspondente á distancia indicada na columna da esquerda, que se somma com o producto do numero do 2.º termo, na mesma linha da distancia, pelo numero de metros de elevação.

Assim, para 2 milhas, e 10 metros de elevação

$$\text{Depressão} = 50.4'' + 557'' = 607'' = 10'\,7''$$

Taboa 6) Parallaxe em altura do Sol

Esta correcção é sempre positiva.
Assim, para 40° de altura, a correcção é + 7″.

Taboa 7) Augmento de ½ diametro horizontal da Lua

Dá esta taboa a quantidade que é necessario juntar ao ½ diametro horizontal da Lua, para ter o ½ diametro em altura.

A correcção é pois sempre additiva á altura apparente da Lua.

Assim, para o semi-diametro 16′ 30″ e altura apparente 42°, a correcção é + 11.8″.

Taboa 8) Diminuição da parallaxe equatorial da Lua

Esta taboa dá o numero de segundos a subtrahir á parallaxe horizontal da Lua, quando se queira levar em conta o achatamento da terra, apreciado proximamente em $\frac{1}{305}$.

Esta correcção é muito importante nos calculos lunares.

Assim, para a parallaxe equatorial 56′ e latitude 48°, a correcção (sempre subtractiva) é 6.1″.

Taboa 9) Parallaxe em altura dos Planetas

No respectivo cruzamento da columna da parallaxe horizontal do planeta com a horizontal que passa pela altura encontra-se a correcção, sempre additiva á mesma altura.

Assim, para a altura apparente 40° e parallaxe horizontal 9″, a correcção é + 7″.

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Taboa 10) Correcção da altura do Sol

Simplifica consideravelmente esta taboa o processo de corrigir a altura do limbo inferior do Sol, applicando-lhe parcialmente as correcções de depressão, semi-diametro, refracção e parallaxe, correcções que n'esta taboa são representadas por uma só, sendo comtudo os resultados sufficientemente acceitaveis na pratica.

Como o ½ diametro do Sol é variavel em cada mez, attendendo a esta circumstancia, indica a taboa na parte inferior a quantidade a juntar ou a subtrahir á correcção, tomada em funcção da altura observada e elevação do observador.

EXEMPLO

Em agosto observou-se a altura do limbo inferior do Sol por 36° e 6 metros de elevação.

Pede-se a altura verdadeira.

Suppõe-se a altura observada correcta do erro do instrumento.

36° e 6 metros.....	10.5′	
Agosto	— 0.2	
Correcção	+ 10.3′	ou 10′ 18″
Alt.ª observada ☉	36° 00′ 00″	
	+ 10 18	
Alt.ª verdadeira ☉	36° 10′ 18″	

A correcção d'esta taboa é sempre additiva.

Taboa 11) Conversão do arco em tempo e reciprocamente

A primeira parte d'esta taboa converte um angulo ou arco em horas, minutos e segundos de tempo.

A segunda parte, horas, minutos e segundos de tempo, em graus, minutos e segundos de angulo ou arco.

EXEMPLOS

Seja a converter 96° 25′ 30″ em tempo

	96°		6ʰ 24ᵐ
	25′		1 40ˢ
	30″		2
a	96° 25′ 30″	corresponde	6ʰ 25ᵐ 42ˢ

Seja a converter 3ʰ 45ᵐ 17ˢ em arco

	3ʰ		45°
	45ᵐ		11 15′
	17ˢ		4 15″
a	3ʰ 45ᵐ 17ˢ	corresponde	56° 19′ 15″

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Taboa 12) Angulo horario de um Astro e altura no instante mais favoravel para a determinação da hora

O instante das circumstancias favoraveis para o calculo da hora dá-se quando o astro passa no primeiro vertical, e esta passagem tem logar quando a declinação é do mesmo nome que a latitude, mas menor do que esta.

Quando a declinação é maior do que a latitude, o instante favoravel da observação é aquelle em que o angulo de posição é recto, isto é, quando o astro se acha nas proximidades dos pontos E. ou W.

Quando a latitude do logar e declinação do astro teem denominações differentes, o astro nunca passa no primeiro vertical; deve então ser observado tão longe quanto possivel do meridiano.

As suas alturas não devem ser inferiores a 15°, para evitar os erros de refracção devidos ás fracas alturas.

A taboa dá o angulo horario ou hora verdadeira e correspondente altura, quando a latitude e declinação são do mesmo nome.

Tem dois argumentos, a latitude designada nas columnas lateraes e a declinação na horizontal ao alto.

As declinações são até 40°.

Para declinações superiores a 40°, mas em latitudes inferiores a este numero, a taboa ainda póde servir, invertendo-se os argumentos.

Procurar-se-ha latitude onde diz declinação, e esta onde diz latitude.

Se o astro a observar é o Sol, a taboa fornece immediatamente a hora e altura correspondente.

Se se trata de uma Estrella, calcula-se primeiro a hora da sua passagem pelo Meridiano; subtrahe se em seguida d'esta hora, a hora da taboa correspondente á latitude e declinação da Estrella, ou faz-se a somma das duas horas, segundo que a observação tem de ser feita antes ou depois da passagem. O resultado dá a hora verdadeira que se procura.

Se se trata de um Planeta, procede-se como para a Estrella, com a differença de se converter em tempo verdadeiro, com a devida applicação da equação do tempo, a hora da passagem meridiana, que no Almanach Nautico é dada em tempo medio.

EXEMPLOS

1.°

Qual o angulo horario do Sol e altura mais favoraveis para a determinação da Hora, em 16 de maio de 1890 na latitude 36° N?

Declinação = 19° 9′ N.

A taboa, para lat. 36° e decl. 19° 9′, dá:

$H = 4^h\ 7^m$ $\qquad$ $A = 33°\ 38'$

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2.º

Qual o angulo horario e altura de Regulus (α do Leão) mais favoraveis para a determinação da Hora, em 10 de fevereiro de 1896, na latitude 38° N?

Æ *	$10^h\ 02^m\ 53^s$
Æ ⊙	21 34 47
Hora da passagem meridiana	$12^h\ 28^m\ 06^s$

A declinação da Estrella é 12° 28′ N.
Para a latitude 38° e declinação 12° 28′ a taboa dá:

	$4^h\ 54^m\ 00^s$	A = 20° 35′
	12 28 06	
Æ	$7^h\ 34^m\ 06^s$ (p. m.)	

3.º

Qual o angulo horario e altura do planeta Saturno mais favoraveis para a determinação da Hora, em 18 de agosto de 1896, na latitude 40° S?

Declinação = 13° 45′ S.

Passagem meridiana	$4^h\ 56^m$	
Latitude 40	4 52	
Declinação 14		
	$9^h\ 48^m$	A = 22° 7′
eqt.	— 4	
Æ	$9^h\ 44^m$	

4.º

Qual o angulo horario da Lua, e altura mais favoraveis para a determinação da Hora, em 22 de julho de 1896, na latitude 36° S. e longitude 60° E?

Hora da passagem meridiana a bordo.....		$10^h\ 24^m\ 00^s$
Longitude em tempo.....		4
Hora correspondente em Greenwich		$6^h\ 24^m\ 00^s$
Declinação para esta hora	27° 13′ S.	
Passagem meridiana	$10^h\ 24^m\ 00^s$	A = 50° 34′
Latitude 36	3 02 00	
Declinação 27		
	$13^h\ 26^m\ 00^s$	
eqt.	— 6 14	
Æ	$13^h\ 19^m\ 46^s$ (p. m.)	

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Taboas 13 e 13–a) Variação do angulo no Polo

Taboa 14) Azimuths

As Taboas 13 e 13–a usam-se em combinação, e dão o erro da longitude ou variação do angulo no Polo, por effeito de um erro ou accrescimo de um minuto na latitude.

A Taboa 14, servindo-se d'essa variação ou correcção, dá o azimuth verdadeiro do astro.

São argumentos, na Taboa 13, a latitude e angulo horario, na 13–a, a declinação e angulo horario, e na Taboa 14 a correcção dada pelas outras duas taboas, indicada na columna da esquerda, e a latitude do logar.

Levando em conta as regras dos signaes, designadas no alto de cada taboa, e recorrendo ás interpolações, caso isso se torne necessario, é facilimo o emprego das taboas.

EXEMPLO

Calcular a variação que soffre a longitude, devida ao accrescimo de 10′ na latitude.

Seja a latitude 21° 40′ S., declinação 13° 14′ S., e o angulo horario de um astro a E. do meridiano $1^h\ 49^m\ 00^s$.

Taboa 13	Lat.	21° 40′ S.	+0.77′
	AH	$1^h\ 49^m$	
Taboa 13–a ...	Decl.	13° 14′ S.	—0.51
	AH	$1^h\ 49^m$	
Fazendo a somma algebrica, correcção.....			0.26′

A variação do angulo no polo, para um minuto a mais na latitude, é 0.26′.
Para 10′ será 2.6′ ou 2′ 36″. Assim, se as coordenadas de um ponto são:

Latitude = 21° 40′ 00″ S.
Longitude 0 53 42 E.

as coordenadas de um outro ponto, vizinho do primeiro, differindo ás latitudes de 10′, são:

Latitude = 21° 50′ 00″ S.
Longitude 0 56 18 E.

Para calcular o azimuth verdadeiro, seja ainda Lat. 22° S. e correcção 0.26.
A Taboa 14, com uma pequena interpolação, dá:

z = N. 76° 5′ E.

O conhecimento das coordenadas de dois pontos vizinhos ou do azimuth são os elementos para o traçado de uma recta de altura.

Mas, alem do valioso serviço que estas taboas prestam para o referido traçado, servem tambem para resolver outros problemas muito frequentes na navegação.

Indicaremos os principaes.

Dada a latitude do Navio, altura de um astro, e azimuth verdadeiro, achar a sua ascensão recta, e por consequencia o nome do astro.

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Póde ter logar este problema, quando se observa uma estrella entre nuvens, sem se poder reconhecer a que constellação pertence.

O astro deve ser marcado em seguida á observação, e deduzir-se, com a conveniente applicação da variação da agulha, qual o azimuth verdadeiro, e convertel-o em tempo.

As regras para o problema são:

1.º Entra-se na Taboa 13 com a latitude do navio (argumento vertical) e azimuth verdadeiro (argumento horizontal); toma-se o respectivo numero, e dá-se-lhe o signal — ou +, segundo que o azimuth é contado do polo superior ou inferior.

2.º Entra-se na Taboa 13-a com a altura verdadeira (argumento vertical, columna declinação), e azimuth verdadeiro (argumento horizontal), e dá-se ao numero achado o signal +.

3.º Faz-se a somma algebrica dos numeros obtidos, e entra-se com ella na Taboa 14 (argumento vertical, columna correcção), e com a latitude (argumento horizontal).

O numero achado representa o angulo no polo, se a somma tem o signal +, ou o supplemento, se tem o signal —.

4.º Converte-se este angulo em tempo. Será o angulo horario se o astro foi observado a W., e a differença do mesmo angulo para 24 horas se foi observado a E.

5.º Subtrahe-se este angulo horario da Hora sideral de bordo no momento da observação; o resultado é a ascensão recta.

Procura-se no Almanach Nautico qual a estrella que na data da observação tinha aquella ascensão recta. Se nada constar do catalogo das estrellas, procura-se no dos planetas.

E como meio de verificação, determina-se a declinação.

EXEMPLO

Em 5 de janeiro de 1890, na latitude estimada de 18° 17′ N. e longitude estimada de 55° 20′ W., pelas $4^h\ 58^m\ 25^s$ (a. m), tomou-se a altura de uma estrella, não se conhecendo a que constellação pertencia.

A altura verdadeira foi 24° 23′, o azimuth verdadeiro S. 87.8° W., e a observação foi feita a W. do meridiano.

Pretende-se saber qual a estrella observada.

A = 24° 23′ z = S. 87.8 W. = $5^h\ 51^m\ 08^s$

Hora media a bordo $4^h\ 58^m\ 25^s$ (a. m.)

T. 13)	+	0.01
T. 13-a)	+	0.45
	+	0.46

T. 14) Æ = 66.12° = 66° 7′ = $4^h\ 24^m\ 28^s$

Hora media a bordo	$16^h\ 58^m\ 25^s$
Æ do Sol medio	18 59 35
Hora sideral	$11^h\ 58^m\ 00^s$
Æ	4 24 28
Æ *	$7^h\ 33^m\ 32^s$

A estrella que tem esta ascensão recta é Procyon (α do cão pequeno).

Calculo da Declinação (verificação)

Entra-se na Taboa 14 com a latitude e azimuth, e toma-se da columna *corr.* o numero correspondente.

Com o angulo no Polo e latitude, toma-se da Taboa 13 o numero que corresponde ao cruzamento d'estes dois argumentos.

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Faz-se a differença entre os numeros achados.

Com esta differença e angulo no Polo, entra-se na Taboa 13-a, e toma-se a declinação.

Se esta coincidir ou se se approximar da do presumivel astro, não póde haver duvida sobre o seu nome.

T. 14).....	—	0.05
T. 13).....	—	0.14
	+	0.11

T. 13-a) Declinação = 6° N.

A verdadeira declinação é 5° 30′ 22″ N.

Calcular a altura de um astro para uma hora verdadeira ou media, conhecida a latitude, angulo no Polo, e azimuth.

1.° Entra-se na Taboa 14 com a latitude como argumento horizontal, e na respectiva columna com o angulo no Polo ou o supplemento (reduzido a graus), procura-se na columna *corr.* o numero que lhe corresponde, que terá o signal + ou —, segundo que o angulo no Polo é menor ou maior que 90°.

2.° Da Taboa 13 com a latitude (argumento vertical) e azimuth (argumento horizontal), toma-se o respectivo numero, que terá o signal + ou —, segundo que o azimuth é contado do Polo superior ou do inferior.

3.° Faz-se a somma algebrica dos numeros achados, e entra-se na Taboa 13-a com o azimuth (argumento horizontal), e na respectiva columna com a referida somma procura-se qual o numero correspondente na columna declinação.

O numero achado (angulo) representa a altura verdadeira.

Sejam Lat. = 18° 17′ N. $\mathcal{H}$ = 66° 7′ z = 5h 51m 08s

T. 14).....	+	0.46
T. 13).....	—	0.01
T. 13-a).....	+	0.45

A = 24°

A altura obtida vem geralmente affectada de um erro de meio grau. Para calculos em que se exija maior rigor, convem calcular a altura pelo processo empregado com as Taboas para o calculo da Hora (problema reciproco).

Navegação orthodromica

Conhecidas as coordenadas dos pontos de partida e chegada, determinar o rumo inicial ou da partida, para seguir o arco de circulo maximo que passa pelos dois pontos.

As regras são:

1.° Entra-se na Taboa 13 com a latitude de partida (argumento vertical), e a differença de longitudes (argumento horizontal). Dá-se ao numero achado o signal — ou +, segundo que a differença de longitudes é de 0° a 90° ou de 90° a 180°.

2.° Entra-se na Taboa 13-a com a latitude de chegada (argumento vertical), e a differença de longitudes (argumento horizontal). Dá-se ao numero achado o signal + ou —, segundo que as latitudes são do mesmo nome ou de nome contrario.

3.° Faz-se a somma algebrica dos numeros obtidos, e entra-se com o resultado na Taboa 14 como argumento vertical e a latitude de partida como argumento horizontal.

O numero achado é o rumo inicial que se conta do polo da partida ou do polo opposto, segundo que aquella somma tem o signal + ou —.

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EXEMPLO

Sejam os pontos de partida e chegada

Cabo S. Vicente		Cabo Race	
Lat.....	37° 00′ N.	Lat.....	46° 40′ N.
Long.....	9 00 W.	Long.....	53 04 W.

Diff. de longitudes = 44° 04′ = 2ʰ 56ᵐ 16ˢ

T. 13	—	0.78
T. 13–a	+	1.53
	+	0.75

Rumo inicial T. 14) 59° NW.

Dadas as coordenadas dos pontos de partida e chegada, e o rumo inicial ou da partida, calcular as coordenadas intermedias do arco de circulo maximo, que liga os dois pontos.

O methodo consiste em fazer variar a longitude, calculando-se assim a latitude correspondente.

São elementos do calculo a latitude da partida, o numero, que no problema antecedente serviu para a determinação do rumo inicial, e a differença no polo entre o meridiano da partida e o meridiano da latitude que se pretende obter, ou differença de meridianos, grandeza que se arbitra.

As regras a seguir são:

1.° Entra-se na Taboa 13 com a latitude de partida (argumento vertical), e a differença de meridianos (argumento horizontal); dá-se ao numero achado o signal + ou —, segundo que a referida differença é menor ou maior que 90°.

2.° Faz-se a somma algebrica d'este numero com o que serviu para o calculo do rumo inicial.

3.° Entra-se na Taboa 13-a com a differença de meridianos (argumento horizontal), e procura-se na columna declinação o angulo que corresponde á referida somma. Este angulo representa a latitude correspondente á longitude que se arbitrou.

Seja, como exemplo, o do problema antecedente:

Cabo S. Vicente		Cabo Race	
Lat.....	37° 00′ N.	Lat.....	46° 40′ N.
Long.....	9 00 W.	Long.....	53 04 W.

Seja Longitude 20°

Diff. de meridiano = 11° = 0ʰ 44ᵐ

T. 13).....	+	3.88
Numero do rumo.....	+	0.75
	+	4.63

T. 13–a) 41° 25′

1.° ponto... { Lat. 41° 25′ N.
Long. 20 W.

De uma maneira analoga achar-se-ha

2.° ponto	Long. 30° W. (diff. de meridiano 21)	Lat. 44° 09′ N.
3.° ponto	Long. 40° W. (diff. de meridiano 31)	Lat. 45 51 N.
4.° ponto	Long. 50° W. (diff. de meridiano 41)	Lat. 46 37 N.

E assim por deante.

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Unem-se os differentes pontos da carta por meio de linhas rectas, ou traça-se a curva por meio de pontos; teremos assim o traçado graphico do arco de circulo maximo.

Taboa 15) Culminação dos Astros (segundos)

Taboa 15-a) Quadrados dos Angulos no Polo

Servem estas taboas para determinar a Latitude pelas Alturas circummeridianas.

A regra é a seguinte:

Observem se algum tempo antes ou depois do meio dia, nos limites convenientes consignados n'um quadro mais adeante, varias alturas do Sol, notando-se para cada uma a hora do chronometro.

Calcule-se em seguida a media das alturas e a media das horas, applicando-se-lhe as devidas correcções.

Calcule-se tambem a hora do chronometro, correspondente ao meio dia verdadeiro de bordo, e faça-se a differença entre esta hora e a correspondente á altura media, exprimindo este intervallo em minutos e fracções, e elevando-o ao quadrado ou fazendo uso da Taboa 15-a.

Entre-se depois na Taboa 15 com a latitude approximada do navio e declinação do astro, tomando do respectivo cruzamento a variação em um minuto das alturas circummeridianas.

Multiplique-se esta variação pelo quadrado do intervallo (angulo no Polo).

O producto é em segundos a correcção a juntar á media das alturas, para ter a altura meridiana.

E no resto procede-se como para o caso usual da latitude pela altura meridiana.

EXEMPLO

Em 10 de maio de 1890, na latitude estimada de 40° 10′ N. e longitude 114° 3′ W. tomaram-se, alguns minutos antes do meio dia, varias alturas do Sol, notando-se de cada vez a hora do chronometro.

A media correcta foi de 67° 22′ 04″, e a correspondente hora do chronometro, tambem correcta (do estado e marcha), $8^h\ 48^m\ 06^s$.

Declinação correcta para o meio dia 17° 46′ N.

Pede-se a latitude.

Hora do chronometro ao meio dia verdadeiro.....	$8^h\ 56^m\ 42^s$
Hora do chronometro á observação.....	8 48 06
Intervallo ou angulo no Polo.....	$8^m\ 36^s$

Taboa 15-a) $(8^m\ 36^s)^2 = 74.0$

Taboa 15) .. { 40° 10′ Lat. N. / 17 46 Decl. N. } 3.81″

$3.81'' \times 74 = 4'\ 42''$

Alt.ª ⊖ 67° 22′ 04″
+ 4 42

67° 26′ 46″ S.
22 33 14 N.
17 46 00

Lat. N. 40° 19′ 14″

Estas taboas podem servir para qualquer outro astro que não seja o Sol, comtanto que a declinação não exceda os limites da Taboa 15, cujos argumentos podem ser invertidos para declinações até 60°, e latitudes inferiores a 24°.

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O tempo limite das circummeridianas é designado no quadro seguinte:

Lat. e Decl. do mesmo nome							Lat. e Decl. de nome contrario						
Lat.	Declinação						Lat.	Declinação					
	0°	5°	10°	15°	20°	24°		0°	5°	10°	15°	20°	24°
	m	m	m	m	m	m		m	m	m	m	m	m
0	–	8.1	13.9	18.7	23.6	27.5	0	–	8.1	13.7	18.4	23.6	27.5
5	8.1	–	8.1	13.8	19.0	22.9	5	8.1	13.7	18.7	23.7	27.8	31.6
10	13.7	8.1	–	8.3	14.0	18.4	10	13.7	18.7	23.2	27.8	32.4	35.7
15	18.7	13.8	8.3	–	8.5	13.4	15	18.7	23.4	27.8	32.0	36.6	40.0
20	23.6	19.0	14.0	8.5	–	7.4	20	23.6	27.8	32.4	36.6	41.1	45.1
25	28.4	24.0	19.5	14.5	8.8	–	25	28.4	32.9	36.6	41.1	45.5	49.2
30	33.3	29.1	24.8	20.0	15.1	10.4	30	33.3	37.3	41.0	45.3	50.6	54.0
35	38.6	34.4	29.1	25.5	21.1	16.9	35	38.6	42.7	47.6	50.9	55.9	61.4
40	44.5	40.0	35.5	31.6	27.1	23.1	40	44.5	47.6	52.1	57.5	64.0	68.9
45	51.2	46.6	41.6	37.4	33.1	29.7	45	51.2	54.9	59.1	64.0	72.1	75.7
50	56.5	51.2	49.0	44.5	40.5	36.6	50	56.5	63.0	68.4	72.1	79.6	88.0
55	65.2	60.2	55.8	51.8	56.8	43.9	55	65.2	68.4	74.9	82.9	93.5	101.3
60	77.2	74.4	64.6	61.9	57.1	53.2	60	77.2	81.4	90.8	98.0	114.7	130.6

Taboa 16) Nascer e Pôr verdadeiro dos Astros

Esta taboa indica em tempo o arco percorrido pelo astro do horizonte ao Meridiano e o arco descendente do Meridiano ao horizonte.

São argumentos a latitude e a declinação.

Estes podem ser invertidos.

Se o astro é o Sol, a taboa dá a Hora do Nascer, quando a latitude e declinação são do mesmo nome. O complemento para 12 horas é a hora do Pôr.

Quando porém latitude e declinação são de nome contrario, a hora da taboa é a do Pôr. A correspondente hora do Nascer é a differença para 12 horas.

EXEMPLOS

Lat. 39 N..... Nascer $4^h\ 51^m$
Decl. 20 N..... .... Pôr 7 09

Lat. 30 S..... Pôr $5^h\ 09^m$
Decl. 21 N..... Nascer 6 51

Se o astro é uma estrella ou planeta, ha que:

1.° Determinar a hora da sua passagem pelo Meridiano.

2.° Tomar da taboa a hora correspondente á latitude e declinação.

Se a latitude e declinação são do mesmo nome, a somma das duas horas dá o Nascer e a differença o Pôr.

Se são de nome contrario, a differença é a hora do Nascer e a somma a do Pôr.

EXEMPLOS

1.°

A que hora verdadeira na latitude 50° N. teve logar o Nascer e Pôr de Arcturus (α Bootis) em 1 de junho de 1896?

Para calcular a primeira Hora (Hora da passagem da estrella pelo meridiano), procura-se no Almanach Nautico a sua ascensão recta para a data referida (augmen-

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tada de 24 horas, se isso se tornar necessario), e subtrahe-se d'ella a Hora sideral, dada na pagina II do mesmo Almanach, correspondente ao meio dia do dia designado.

O resultado é a hora media approximada da passagem da estrella pelo meridiano, á qual se applica com o respectivo signal a equação do tempo, para a converter em hora verdadeira.

EXEMPLOS

1.º

Decl. 19° 43′ 00″ S.
Lat. 50 00 00 N. } $4^h\ 18^m$

☌.....	$14^h\ 10^m\ 58^s$	
Hora sideral....	4 41 52	
	$9^h\ 29^m\ 06^s$	
eqt.	— 2 20	
Hora verdadeira da passagem meridiana	$9^h\ 26^m\ 46^s$	
	4 18 00	
	$13^h\ 44^m\ 46^s$	
	1 44 46	Nascer
	5 08 46	Pôr

2.º

A que hora verdadeira, em 1 de junho de 1896, na latitude 38° S. teve logar o Nascer e o Pôr de Regulus (α Leonis)?

Decl. 8° 32′ 30″ N.
Lat. 38 00 00 S. } $5^h\ 34^m$

☌.....	$10^h\ 02^m\ 52^s$	
Hora sideral....	4 41 52	
	$5^h\ 21^m\ 00^s$	
eqt.	— 2 20	
Hora verdadeira da passagem meridiana....	$5^h\ 18^m\ 40^s$	
	5 34 00	
	$0^h\ 15^m\ 20^s$	Nascer
	10 52 40	Pôr

3.º

A que hora media, em 30 de agosto de 1896, na latitude 38° 43′ N. e longitude $0^h\ 36^m\ 45^s$ W., teve logar o nascer da lua?

Taboa 19 e pag. IV do *Almanach Nautico*.....	Agosto 30 ...	$17^h\ 31.7^m$
	» 31 ...	18 24.8
		53.1 ᵐ
	diff. long.	× 0.62
		32.922ᵐ / 24 = 1.38ᵐ
		$17^h\ 31^m\ 42^s$
		1 23
Hora da passagem meridiana ..		$17^h\ 33^m\ 05^s$

Decl. para esta Hora..... 26° 21′ 43″ N.
Lat..... 38 43 00 N. } $4^h\ 27^m$
17 33

	$22^h\ 00^m$
Hora approximada do Nascer.....	10 00

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Querendo approximar mais esta hora, calcule-se a declinação para a correspondente Hora de Greenwich.

	$10^h\ 00^m$	
diff. long.	0 37 W.	
	$10^h\ 37^m$	
Decl.	25 44	$4^h\ 29^m$
Lat.	38 43	
Taboa 19)	— 16	
	$4^h\ 13^m$	
	17 33	
	$21^h\ 46^m$	
Hora do Nascer..	9 46 (p.m.)	

Taboa 17) Amplitudes

Dá esta taboa a amplitude ao Nascer e Pôr verdadeiro dos astros.

São argumentos a latitude e declinação.

As amplitudes contam-se de E. ou W., segundo que a marcação do Sol foi ao Nascer ou ao Pôr, e para N. ou para S. se a declinação fôr N. ou S.

EXEMPLO

Ao Pôr do Sol ..... { Lat. 40 N. / Decl. 20 N. } Ampl. = W. 26° 30′ N.

Emprega-se ordinariamente a amplitude para o calculo da variação da agulha.

Determina-se o azimuth verdadeiro, que se obtem subtrahindo a amplitude de 90°, se latitude e declinação são do mesmo nome, ou somma-se com 90°, se latitude e declinação são de nome contrario.

Tanto n'um como n'outro caso obtem-se o azimuth verdadeiro, contado do Polo superior.

Faz-se depois a differença entre o azimuth verdadeiro e a marcação pela agulha em relação ao Polo superior, se estão do mesmo lado do meridiano, ou somma-se no caso contrario.

O resultado é a variação da agulha.

Taboa 18) Correcção da Declinação do Sol

Serve esta taboa para passar da declinação para o meio dia de Greenwich, dada no Almanach Nautico, para o meio dia do logar da observação.

No alto da taboa indica-se a regra a seguir.

EXEMPLO

Qual a declinação para o meio dia em 100° de longitude no dia 2 de abril de 1890?

Attendendo á regra, ter-se-ha

Decl.	5° 01′ 19″ N.
Corr.	+ 6
	5° 07′ 19″ N.

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Querendo levar mais longe a exactidão, é dispensavel a taboa.

Toma-se do *Almanach Nautico* para uma dada data não só a declinação, mas tambem a variação correspondente a uma hora, que se multiplica pela longitude em tempo, applicando o resultado á declinação, conforme a regra da taboa.

Seja o mesmo exemplo.

Variação em 1 nora 57.56″

$100^{\circ} = 6^{h}\,40^{m} = 6.7^{h}$

$6.7^{h} \times 57.56 = 385.62'' = 6'\,25.7''$

$$\begin{array}{r} 5^{\circ}\,01'\,19'' \\ +\quad 6\;26 \\ \hline 5^{\circ}\,07'\,45'' \text{ N.} \end{array}$$

Taboa 19) Reducção da Hora da Culminação da Lua por effeito da longitude

Um dos argumentos d'esta taboa é a differença entre duas culminações superiores e consecutivas, ou a retardação diaria da passagem da Lua pelo primeiro meridiano, intervallo de tempo, que varía de 44 a 66 segundos; o outro argumento é a longitude.

Toma-se do Almanach Nautico a differença entre a passagem da Lua pelo meridiano no dado dia e o precedente nas longitudes E. ou o seguinte nas longitudes W.

Com esta differença (retardação) e a longitude entra-se na taboa. Os minutos dados por esta juntam-se á hora da passagem nas longitudes W., e subtrahem-se nas longitudes E.

O resultado é, em tempo medio, a hora da passagem da Lua pelo meridiano do logar.

EXEMPLO

Qual a hora da passagem da Lua pelo meridiano 105° W. em 9 de abril de 1890?

Almanach Nautico, pag. IV ..... { Abril 9 $16^{h}\,5.2^{m}$
» 10 17 4.4
59.2^{m}

Para 59.2^{m} e longitude 105 W., a correcção é, com uma pequena interpolação, 17′ 12″.

$$\begin{array}{r} 16^{h}\,05^{m}\,12^{s} \\ +\quad 17\;12 \\ \hline 16^{h}\,22^{m}\,24^{s} \end{array}$$

Hora da passagem da Lua pelo meridiano 105° W. em 9 de abril de 1890.

Para maior exactidão, póde-se prescindir da taboa, e adoptar as regras seguintes:

1.ª Tomar a hora da passagem meridiana da Lua (upper) da pagina IV do *Almanach Nautico* para o dado dia astronomico.

2.ª Fazer a differença entre a hora da passagem no referido dia e o seguinte nas longitudes W., ou o precedente nas longitudes E.

3.ª Multiplicar a differença pela longitude em tempo, e dividir o producto por 24. O resultado é a correcção a applicar á hora da passagem no dado dia, juntando-a nas longitudes W., e subtrahindo-a nas longitudes E.

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Seja o exemplo antecedente:

$105^{\circ} = 7^{h}$
$\quad 59.2$
$414.4 = 17.3^{m}$

Abril 9	16^{h}	5.2^{m}
» 10	17	4.4
		59.2^{m}
	16^{h}	5.2
+		17.3
	16^{h}	22.5^{m}

Hora da passagem meridiana $16^{h}\ 22^{m}\ 30^{s}$

Taboa 20) 2.ª Correcção da Distancia apparente da Lua

Esta taboa é tão sómente usada no problema das distancias lunares pelos methodos approximados, e dá a 2.ª correcção a applicar á distancia apparente já modificada pela 1.ª correcção.

Entra-se com a distancia apparente na linha superior ou inferior da taboa, e alternadamente na columna da esquerda com as correcções parciaes da Lua em altura e distancia.

A differença entre os numeros de segundos achados de cada vez junta-se á distancia apparente (já correcta com a 1.ª correcção) quando menor que 90°, ou subtrahe-se quando maior.

EXEMPLO

Seja a distancia apparente.....	70°
A correcção da Lua em altura	36′
A correcção da Lua em distancia.....	13′

Com 70° e 36′ ... 4″
70 e 13 ... 1

$4'' - 1'' = 3''$

Distancia verdadeira = 70° 00′ 03″

Taboa 21) Navegação orthodromica

Serve esta taboa especialmente para o traçado graphico da projecção de um arco de circulo maximo sobre a carta.

Os argumentos são P e θ.

P é a differença ou somma de P′ e δ, sendo P′ a differença de longitudes entre a do ponto de intersecção do arco de circulo maximo com o equador, e a de um dos pontos extremos do arco, considerado como ponto de partida.

Ha pois dois valores para P′, que, sommados nas latitudes extremas de nomes differentes, ou subtrahidos nas do mesmo nome, dão a differença das longitudes dos pontos extremos. Escolhe-se aquelle que depende do ponto de partida, a partir do qual se queira começar a determinação das coordenadas intermedias.

δ é uma grandeza variavel, que se arbitra á longitude de partida.

P é pois a differença de longitudes entre a do referido ponto de intersecção e a do ponto de latitude a calcular.

θ é o angulo de intersecção do arco de circulo maximo com o equador.

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Convem notar que o ponto de intersecção está comprehendido entre as longitudes de partida e chegada, quando as latitudes correspondentes teem nomes differentes, e sáe fóra dos limites das longitudes nas latitudes do mesmo nome.

A taboa resolve pois o seguinte problema:

Conhecidas as coordenadas geographicas de dois pontos por onde passa um arco de circulo maximo, e o rumo inicial ou angulo do meridiano da partida com o referido arco, determinar as coordenadas dos differentes pontos do mesmo arco.

REGRAS

Determinação de P

Como P depende de P′, tem que se determinar primeiro este.

Entra-se na taboa com a latitude de partida (argumento horizontal), e o rumo da partida (argumento vertical). O cruzamento dá P′.

Arbitrada a grandeza δ, faz-se a somma ou differença entre P′ e δ, quando nas latitudes extremas do mesmo nome o ponto de partida está mais proximo ou mais afastado do equador do que o ponto de chegada; e a differença entre P′ e δ nas latitudes extremas de nomes differentes.

N'este ultimo caso, quando δ é maior que P′, a latitude a calcular é de nome differente do da latitude da partida. Em qualquer dos casos, o resultado é P.

Determinação de θ

Entra-se na taboa com P′ (argumento horizontal) e a co-latitude de partida (argumento vertical). O cruzamento dá $90-\theta$, e por consequencia θ.

Designe-se por φ e λ a latitude e longitude de qualquer ponto.

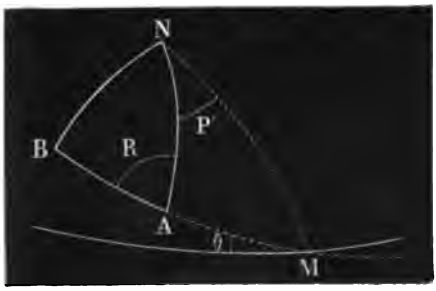
Determinação de λ

Somma-se ou subtrahe-se a longitude de partida com δ, segundo que as longitudes crescem ou decrescem. O resultado é λ.

Determinação de φ

Entra-se na taboa com P (argumento horizontal), e θ (argumento vertical). O cruzamento dá φ correspondente a λ.

EXEMPLOS



(A) Cabo S. Vicente.... ..... { Lat. 37° 00′ N. / Long. 9 00 W.

(B) Cabo Race ..... { Lat. 46 40 N. / Long. 53 04 W.

R = 59° 13′ NW.
P = 46 17
A taboa dá..... θ = 46 40

δ = 2° 43′	8° 43′	14° 43′	20° 43′	26° 43′	32° 43′	38° 43′	41° 43′	44° 04′
P′ = 45 17	45 17	45 17	45 17	45 17	45 17	45 17	45 17	45 17
P = 48° 00′	54° 00′	60° 00′	66° 00′	72° 00′	78° 00′	84° 00′	87° 00′	89° 21′
λ = 11 43 W.	17 43 W.	23 43 W.	29 43 W.	35 43 W.	41 43 W.	47 43 W.	50 43 W.	53 04 W.
φ = 38 14 N.	40 37 N.	42 33 N.	44 05 N.	45 14 N.	46 02 N.	46 31 N.	46 38 N.	46 40 N.

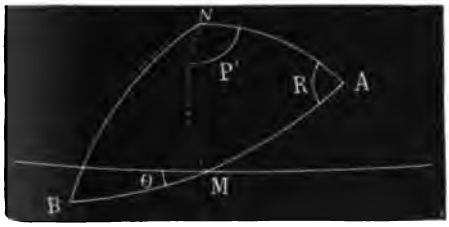
Visto a construcção da taboa, convem, para evitar duplas interpolações, arbitrar a δ valor tal, que, combinado com P′, dê para P um numero multiplo de 3.

Completa o problema a determinação das distancias entre os pontos e o rumo a seguir. Determina-se primeiro a distancia *d*, do ponto de intersecção M a cada ponto calculado, para o que se entra na taboa com $90 - \theta$ (argumento horizontal) e $90 - P$ (argumento vertical). O cruzamento dá $90 - d$, de onde se deduz as distancias entre os pontos.

Do ponto M ao ponto de partida, $d = 55^\circ\ 48'$, e a cada um dos outros pontos 58° 18′, 63° 30′, 68° 23′, 73° 01′, 77° 26′, 81° 42′, 85° 52′, 87° 56′ e 89° 33′.

2° 30′, 5° 12′, 4° 53′, 4° 38′, 4° 25′, 4° 16′, 4° 10′, 2° 04′ e 1° 37′ são as distancias do 1.° ao 2.° ponto, do 2.° ao 3.° e assim por deante.

O rumo determina-se, entrando na taboa com φ (argumento horizontal) e $90 - P$ (argumento vertical). O cruzamento dá o complemento do rumo. Os rumos calculados são successivamente 59°, 61°, 65°, 69°, 73°, 77°, 81°, 86°, 88°, 90° NW.



(A) Pharol Lizard ..... { Lat. 49° 58′ N. / Long. 5 12 W.

(B) Cabo Frio ..... { Lat. 23 01 S. / Long. 41 58 W.

R = 34° SW.

P = 27 19′

θ = 68 56

δ = 3° 19′	6° 19′	9° 19	12° 19′	15° 19′	18° 19′	21° 29′	24° 19′	27° 19′	30° 19′	33° 19′
P′ = 27 19	27 19	27 19	27 19	27 19	27 19	27 19	27 19	27 19	27 19	27 19
P = 24° 00′	21° 00′	18° 00′	15° 00′	12° 00′	9° 00	6° 00′	3° 00′	0° 00′	3° 00′	6° 00′
λ = 8 31 W.	11 31 W.	14 31 W.	17 31 W.	20 31 W.	23 31 W.	26 31 W.	29 31 W.	32 31 W.	35 31 W.	38 31 W.
φ = 46 32 N.	42 27 N.	38 41 N.	33 54 N.	28 22 N.	22 04 N.	15 11 N.	7 44 N.	0 00	7 44 S.	15 11 S.

As distancias entre os pontos, e os rumos successivos, obteem-se como no outro exemplo.

Taboa 22) Correcção da Altura das Estrellas

As duas correcções, depressão e refracção, estão reunidas ou representadas por uma só.

Recorre-se a interpolações, quando os elementos entrados não estão exactamente na taboa.

A correcção é sempre subtractiva.

EXEMPLO

Altura observada	18° 40′
Erro instrumental	— 3′ 42″
Elevação do observador	5m.5

	18° 40′ 00″
	— 3 42
	18° 36′ 18″
Correcção	— 7 00
Altura verdadeira ..	18° 29′ 18″

Taboa 23) Reducção da parallaxe horizontal da Lua e semi-diametro para o logar e hora da observação

São argumentos a Hora de Greenwich depois do meio dia ou meia noite, e a differença de parallaxe ou semi-diametro em 12 horas.

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O numero de segundos, dado pela taboa, junta-se á parallaxe ou semi-diametro do meio dia precedente ou meia noite, ou subtrahe-se d'aquelles elementos, segundo que elles crescem ou decrescem.

Para achar a hora de Greenwich depois do meio dia ou meia noite, converte-se o tempo civil em tempo astronomico, ao qual se junta ou subtrahe a longitude em tempo, segundo que esta é W. ou E.

EXEMPLO

Qual a parallaxe horizontal e semi-diametro ás 5 horas (a. m.) de 10 de março de 1890, na longitude 15° E.?

A data astronomica equivalente é 9 de março, 17 horas. E como a observação teve logar em 15° E. longitude, ou 1 hora de differença, será 9 de março 16 horas a correspondente hora de Greenwich ou 4 horas depois da meia noite.

E como esta hora está comprehendida entre 9 de março, meia noite, e 10 de março, meio dia, ter-se-ha para a parallaxe horizontal

Em 9 de março, meia noite	56′ 46.2″
Em 10 de março, meio dia	57 01.2
	15.0″

Para 4 horas depois da meia noite e 15″ de differença em 12 horas, a taboa dá 5.0″; logo

	56′ 46.2″
	5.0
P. H. á hora da observação.....	56′ 51.2″

Procedendo da mesma fórma para o semi-diametro, ter-se-ha

Em 9 de março, meia noite...	15′ 29.7″
Em 10 de março, meio dia	15 33.8
	4.1″

Com 4 horas e 4.1″ a taboa dá 1″; logo

	15′ 29.7″
	1.0
½ diam.	15′ 30.7″

Não se querendo usar a taboa, seguir-se-ha a seguinte regra para achar a correcção:

Multiplicar a differença em 12 horas da parallaxe horizontal, ou semi-diametro, pela hora de Greenwich depois do meio dia ou meia noite, e dividir por 12; ter-se-ha assim para o exemplo empregado:

P. H..... = 56′ 51.2″
½ diam... = 15 31.1

Taboa 24) Correcção para a Hora do Preamar

É sabido que a hora do preamar é egual á hora da passagem da Lua pelo meridiano, mais o estabelecimento do porto, e mais ou menos uma correcção. É esta correcção a fornecida pela taboa.

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EXEMPLO

Qual a hora do preamar em Lisboa (0^h 36^m W. long.) em 16 de julho de 1896?

Parallaxe horizontal 59′

Hora da passagem meridiana	4^h 58.6^m
Correcção	— 1 04
	3^h 54.6^m
Estabelecimento do porto	2 30.0
	6^h 24.6^m
Hora do preamar	6 25

Taboa 25) Logarithmos dos numeros

Dá esta taboa, á simples inspecção, os logarithmos de 1 a 9999.

Com o subsidio das differenças e quadros das partes proporcionaes, a extensão da taboa vae alem do referido limite.

O signal (*) á esquerda de alguns dos grupos dos tres ultimos algarismos do logarithmo indica que os dois primeiros algarismos do logarithmo não estão na mesma linha, mas sim na seguinte.

Taboa 26) Logarithmos das linhas trigonometricas

Serve esta taboa para achar o logarithmo de qualquer linha trigonometrica, e inversamente achar o valor d'esta para um dado logarithmo.

As differenças e quadros de partes proporcionaes, á direita de cada pagina, tem, como se sabe, a utilidade de approximar o logarithmo, ou o valor da linha trigonometrica que se procura.

Taboa 27) Senos naturaes

Dá esta taboa o valor dos senos naturaes n'um circulo de raio egual á unidade, de 1° a 90°, e como consequencia os valores dos complementos dos angulos, isto é, os cosenos naturaes.

As differenças e partes proporcionaes approximam os referidos valores até segundos.

Taboa 28) Conversão de medidas lineares inglezas em medida metrica

Taboa 28-a) Conversão da medida metrica em medida ingleza

A simples inspecção d'estas taboas indica a sua construcção, e mostra facilmente como são usadas.

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TABUAS

PARA O

CALCULO DA HORA

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	0°			1°			2°			3°			4°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	5000	5000	3010	4825	4998	3010	4651	4994	3008	4477	4986	3004	4302	4976	3000	0
1	4997	00	10	23	98	10	48	94	08	74	86	04	00	75	00	1
2	94	00	10	20	98	10	45	94	08	71	86	04	4297	75	00	2
3	91	00	10	17	98	10	42	94	07	68	86	04	94	75	2999	3
4	88	00	10	14	98	09	39	93	07	65	86	04	91	75	99	4
5	85	00	10	11	98	09	36	93	07	62	86	04	88	75	99	5
6	83	00	10	08	98	09	34	93	07	59	85	04	85	74	99	6
7	80	00	10	05	98	09	31	93	07	56	85	04	82	74	99	7
8	77	00	10	02	98	09	28	93	07	53	85	04	79	74	99	8
9	74	00	10	4799	98	09	25	93	07	51	85	04	76	74	99	9
10	4971	5000	3010	4796	4998	3009	4622	4993	3007	4448	4985	3004	4273	4974	2999	10
11	68	00	10	93	98	09	19	93	07	45	85	04	71	73	99	11
12	65	00	10	91	98	09	16	93	07	42	84	04	68	73	99	12
13	62	00	10	88	98	09	13	93	07	39	84	03	65	73	99	13
14	59	00	10	85	98	09	10	92	07	36	84	03	62	73	98	14
15	56	00	10	82	98	09	07	92	07	33	84	03	59	72	98	15
16	53	00	10	79	98	09	04	92	07	30	84	03	56	72	98	16
17	51	00	10	76	97	09	02	92	07	27	84	03	53	72	98	17
18	48	00	10	73	97	09	4599	92	07	24	83	03	50	72	98	18
19	45	00	10	70	97	09	96	92	07	21	83	03	47	72	98	19
20	4942	5000	3010	4767	4997	3009	4593	4992	3007	4419	4983	3003	4244	4971	2998	20
21	39	00	10	64	97	09	90	92	07	16	83	03	42	71	98	21
22	36	00	10	61	97	09	87	91	07	13	83	03	39	71	98	22
23	33	00	10	59	97	09	84	91	07	10	83	03	36	71	98	23
24	30	00	10	56	97	09	81	91	06	07	82	03	33	71	97	24
25	27	00	10	53	97	09	78	91	06	04	82	03	30	70	97	25
26	24	00	10	50	97	09	75	91	06	01	82	02	27	70	97	26
27	21	00	10	47	97	09	73	91	06	4398	82	02	24	70	97	27
28	19	00	10	44	97	09	70	91	06	95	82	02	21	70	97	28
29	16	00	10	41	97	09	67	91	06	92	82	02	18	69	97	29
30	4913	5000	3010	4738	4997	3009	4564	4990	3006	4390	4981	3002	4215	4969	2997	30
31	10	00	10	35	96	08	61	90	06	87	81	02	13	69	97	31
32	07	00	10	32	96	08	58	90	06	84	81	02	10	69	97	32
33	04	00	10	30	96	08	55	90	06	81	81	02	07	68	97	33
34	01	00	10	27	96	08	52	90	06	78	81	02	04	68	96	34
35	4898	4999	10	24	96	08	49	90	06	75	80	02	01	68	96	35
36	95	99	10	21	96	08	46	90	06	72	80	02	4198	68	96	36
37	92	99	10	18	96	08	43	90	06	69	80	02	95	68	96	37
38	89	99	10	15	96	08	41	89	06	66	80	02	92	67	96	38
39	87	99	10	12	96	08	38	89	06	63	80	01	89	67	96	39
40	4884	4999	3010	4709	4996	3008	4535	4989	3006	4360	4980	3001	4186	4967	2996	40
41	81	99	10	06	96	08	32	89	06	58	79	01	84	67	96	41
42	78	99	10	03	96	08	29	89	06	55	79	01	81	66	96	42
43	75	99	10	00	96	08	26	89	05	52	79	01	78	66	96	43
44	72	99	10	4698	95	08	23	89	05	49	79	01	75	66	95	44
45	69	99	10	95	95	08	20	88	05	46	79	01	72	66	95	45
46	66	99	10	92	95	08	17	88	05	43	78	01	69	65	95	46
47	63	99	10	89	95	08	14	88	05	40	78	01	66	65	95	47
48	60	99	10	86	95	08	12	88	05	37	78	01	63	65	95	48
49	57	99	10	83	95	08	09	88	05	34	78	01	60	65	95	49
50	4855	4999	3010	4680	4995	3008	4506	4988	3005	4331	4978	3001	4157	4964	2995	50
51	52	99	10	77	95	08	03	88	05	29	77	00	55	64	95	51
52	49	99	10	74	95	08	00	87	05	26	77	00	52	64	95	52
53	46	99	10	71	95	08	4497	87	05	23	77	00	49	64	95	53
54	43	99	10	68	94	08	94	87	05	20	77	00	46	63	94	54
55	40	99	10	66	94	08	91	87	05	17	77	00	43	63	94	55
56	37	99	10	63	94	08	88	87	05	14	76	00	40	63	94	56
57	34	99	10	60	94	08	85	87	05	11	76	00	37	63	94	57
58	31	99	10	57	94	08	82	87	04	08	76	00	34	62	94	58
59	28	99	10	54	94	08	80	86	04	05	76	00	31	62	94	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	5°			6°			7°			8°			9°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	4128	4962	2994	3955	4945	2986	3781	4925	2978	3608	4903	2968	3436	4877	2956	0
1	26	62	94	52	45	86	78	25	78	05	02	68	33	76	56	1
2	23	61	93	49	45	86	76	25	77	03	02	67	30	76	56	2
3	20	61	93	46	44	86	73	24	77	00	01	67	27	76	56	3
4	17	61	93	43	44	86	70	24	77	3597	01	67	24	75	56	4
5	14	61	93	40	44	86	67	24	77	94	01	67	21	75	55	5
6	11	60	93	37	43	86	64	23	77	91	00	67	18	74	55	6
7	08	60	93	34	43	85	61	23	77	88	00	67	16	74	55	7
8	05	60	93	32	43	85	58	23	77	85	4899	66	13	73	55	8
9	02	60	93	29	42	85	55	22	76	82	99	66	10	73	55	9
10	4100	4959	2993	3926	4942	2985	3752	4922	2976	3579	4899	2966	3407	4872	2954	10
11	4097	59	92	23	42	85	50	22	76	77	98	66	04	72	54	11
12	94	59	92	20	42	85	47	21	76	74	98	66	01	71	54	12
13	91	59	92	17	41	85	44	21	76	71	97	65	3398	71	54	13
14	88	58	92	14	41	85	41	20	76	68	97	65	95	70	54	14
15	85	58	92	11	41	84	38	20	75	65	97	65	93	70	53	15
16	82	58	92	08	40	84	35	20	75	62	96	65	90	70	53	16
17	79	58	92	06	40	84	32	19	75	59	96	65	87	69	53	17
18	76	57	92	03	40	84	29	19	75	56	95	65	84	69	53	18
19	73	57	92	00	39	84	26	19	75	54	95	64	81	68	53	19
20	4071	4957	2991	3897	4939	2984	3724	4918	2975	3551	4894	2964	3378	4868	2952	20
21	68	56	91	94	39	84	21	18	74	48	94	64	75	67	52	21
22	65	56	91	91	38	83	18	17	74	45	94	64	72	67	52	22
23	62	56	91	88	38	83	15	17	74	42	93	64	70	66	52	23
24	59	56	91	85	38	83	12	17	74	39	93	63	67	66	52	24
25	56	55	91	82	37	83	09	16	74	36	92	63	64	65	51	25
26	53	55	91	80	37	83	06	16	74	33	92	63	61	65	51	26
27	50	55	91	77	37	83	03	16	73	31	91	63	58	64	51	27
28	47	55	90	74	36	83	01	15	73	28	91	63	55	64	51	28
29	44	54	90	71	36	82	3698	15	73	25	91	63	52	63	51	29
30	4042	4954	2990	3868	4936	2982	3695	4914	2973	3522	4890	2962	3350	4863	2950	30
31	39	54	90	65	35	82	92	14	73	19	90	62	47	62	50	31
32	36	53	90	62	35	82	89	14	73	16	89	62	44	62	50	32
33	33	53	90	59	35	82	86	13	72	13	89	62	41	61	50	33
34	30	53	90	56	34	82	83	13	72	10	88	62	38	61	49	34
35	27	53	90	54	34	82	80	13	72	08	88	61	35	60	49	35
36	24	52	90	51	34	81	77	12	72	05	88	61	32	60	49	36
37	21	52	89	48	33	81	75	12	72	02	87	61	29	59	49	37
38	18	52	89	45	33	81	72	11	72	3499	87	61	27	59	49	38
39	15	51	89	42	33	81	69	11	71	96	86	61	24	59	48	39
40	4013	4951	2989	3839	4932	2981	3666	4911	2971	3493	4886	2960	3321	4858	2948	40
41	10	51	89	36	32	81	63	10	71	90	85	60	18	58	48	41
42	07	51	89	33	32	81	60	10	71	87	85	60	15	57	48	42
43	04	50	89	30	31	80	57	09	71	85	85	60	12	57	47	43
44	01	50	89	28	31	80	54	09	71	82	84	60	09	56	47	44
45	3998	50	88	25	31	80	51	09	70	79	84	59	07	56	47	45
46	95	49	88	22	30	80	49	08	70	76	83	59	04	55	47	46
47	92	49	88	19	30	80	46	08	70	73	83	59	01	55	47	47
48	89	49	88	16	30	80	43	07	70	70	82	59	3298	54	46	48
49	87	49	88	13	29	79	40	07	70	67	82	59	95	54	46	49
50	3984	4948	2988	3810	4929	2979	3637	4907	2970	3464	4881	2958	3292	4853	2916	50
51	81	48	88	07	29	79	34	06	69	62	81	58	89	53	46	51
52	78	48	87	04	28	79	31	06	69	59	81	58	86	52	46	52
53	75	47	87	02	28	79	28	05	69	56	80	58	84	52	45	53
54	72	47	87	3799	28	79	26	05	69	53	80	58	81	51	45	54
55	69	47	87	96	27	79	23	05	69	50	79	57	78	51	45	55
56	66	46	87	93	27	78	20	04	69	47	79	57	75	50	45	56
57	63	46	87	90	27	78	17	04	68	44	78	57	72	50	44	57
58	61	46	87	87	26	78	14	03	68	41	78	57	69	49	44	58
59	58	46	87	84	26	78	11	03	68	39	77	57	66	49	44	59

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Altura—Somma ou differença—Logarithmos de latitude e declinação

T. X)

′	10°			11°			12°			13°			14°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	3264	4848	2944	3092	4816	2930	2921	4781	2914	2750	4744	2898	2581	4703	2879	0
1	61	48	44	89	16	30	18	81	14	48	43	97	78	02	79	1
2	58	47	43	86	15	29	15	80	14	45	42	97	75	02	79	2
3	55	47	43	83	15	29	12	80	14	42	42	97	72	01	78	3
4	52	46	43	80	14	29	10	79	13	39	41	96	69	00	78	4
5	49	46	43	78	13	29	07	78	13	36	40	96	67	4699	78	5
6	46	45	42	75	13	28	04	78	13	33	40	96	64	99	77	6
7	43	45	42	72	12	28	01	77	12	31	39	95	61	98	77	7
8	41	44	42	69	12	28	2898	77	12	28	38	95	58	97	77	8
9	38	43	42	66	11	28	95	76	12	25	38	95	55	97	76	9
10	3235	4843	2942	3063	4811	2927	2892	4775	2912	2722	4737	2895	2553	4696	2876	10
11	32	42	41	61	10	27	90	75	11	19	36	94	50	95	76	11
12	29	42	41	58	10	27	87	74	11	16	36	94	47	94	76	12
13	26	41	41	55	09	27	84	74	11	14	35	94	44	94	75	13
14	23	41	41	52	08	26	81	73	11	11	34	93	41	93	75	14
15	21	40	40	49	08	26	78	72	10	08	34	93	38	92	75	15
16	18	40	40	46	07	26	75	72	10	05	33	93	36	92	74	16
17	15	39	40	43	07	26	73	71	10	02	32	93	33	91	74	17
18	12	39	40	41	06	25	70	70	09	00	32	92	30	90	74	18
19	09	38	40	38	06	25	67	70	09	2697	31	92	27	89	73	19
20	3206	4838	2939	3035	4805	2925	2864	4769	2909	2694	4730	2892	2524	4689	2873	20
21	03	37	39	32	04	25	61	69	09	91	30	91	22	88	73	21
22	01	37	39	29	04	24	58	68	08	88	29	91	19	87	72	22
23	3198	36	39	26	03	24	56	67	08	85	28	91	16	87	72	23
24	95	36	38	23	03	24	53	67	08	83	28	90	13	86	72	24
25	92	35	38	21	02	24	50	66	08	80	27	90	10	85	71	25
26	89	35	38	18	02	23	47	65	07	77	26	90	07	84	71	26
27	86	34	38	15	01	23	44	65	07	74	26	90	05	84	71	27
28	83	34	37	12	00	23	41	64	07	71	25	89	02	83	70	28
29	81	33	37	09	00	22	38	64	06	68	24	89	2499	82	70	29
30	3178	4833	2937	3006	4799	2922	2836	4763	2906	2666	4724	2889	2496	4681	2870	30
31	75	32	37	03	99	22	33	62	06	63	23	88	93	81	69	31
32	72	31	36	01	98	22	30	62	06	60	22	88	91	80	69	32
33	69	31	36	2998	97	21	27	61	05	57	22	88	88	79	69	33
34	66	30	36	95	97	21	24	60	05	54	21	87	85	79	68	34
35	63	30	36	92	96	21	21	60	05	51	20	87	82	78	68	35
36	60	29	36	89	96	21	19	59	04	49	20	87	79	77	68	36
37	58	29	35	86	95	20	16	59	04	46	19	86	76	76	67	37
38	55	28	35	84	95	20	13	58	04	43	18	86	74	76	67	38
39	52	28	35	81	94	20	10	57	04	40	18	86	71	75	67	39
40	3149	4827	2935	2978	4793	2920	2807	4757	2903	2637	4717	2886	2468	4674	2866	40
41	46	27	34	75	93	19	04	56	03	34	16	85	65	73	66	41
42	43	26	34	72	92	19	02	55	03	32	15	85	62	73	66	42
43	40	26	34	69	92	19	2799	55	02	29	15	85	60	72	65	43
44	38	25	34	66	91	19	96	54	02	26	14	84	57	71	65	44
45	35	24	33	64	90	18	93	53	02	23	13	84	54	70	65	45
46	32	24	33	61	90	18	90	53	02	20	13	84	51	70	64	46
47	29	23	33	58	89	18	87	52	01	17	12	83	48	69	64	47
48	26	23	33	55	89	18	85	51	01	15	11	83	46	68	64	48
49	23	22	32	52	88	17	82	51	01	12	11	83	43	67	63	49
50	3120	4822	2932	2949	4787	2917	2779	4750	2900	2609	4710	2882	2440	4667	2863	50
51	18	21	32	47	87	17	76	50	00	06	09	82	37	66	63	51
52	15	21	32	44	86	16	73	49	00	03	09	82	34	65	62	52
53	12	20	31	41	86	16	70	48	00	01	08	82	31	65	62	53
54	09	20	31	38	85	16	68	48	2899	2598	07	81	29	64	62	54
55	06	19	31	35	84	16	65	47	99	95	06	81	26	63	61	55
56	03	18	31	32	84	15	62	46	99	92	06	81	23	62	61	56
57	00	18	30	29	83	15	59	46	98	89	05	80	20	62	61	57
58	3098	17	30	27	83	15	56	45	98	86	04	80	17	61	60	58
59	95	17	30	24	82	15	53	44	98	84	04	80	15	60	60	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	15°			16°			17°			18°			19°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	2412	4659	2860	2244	4613	2839	2076	4563	2816	1910	4511	2792	1744	4455	2767	0
1	09	59	59	41	12	38	74	62	16	07	10	92	42	54	67	1
2	06	58	59	38	11	38	71	61	15	04	09	92	39	53	66	2
3	03	57	59	35	10	38	68	60	15	02	08	91	36	52	66	3
4	01	56	58	32	09	37	65	60	15	1899	07	91	33	51	65	4
5	2398	55	58	30	09	37	62	59	14	96	06	90	31	50	65	5
6	95	55	58	27	08	37	60	58	14	93	05	90	28	49	64	6
7	92	54	57	24	07	36	57	57	14	90	04	89	25	49	64	7
8	89	53	57	21	06	36	54	56	13	88	03	89	22	48	64	8
9	87	52	57	18	05	35	51	55	13	85	02	89	20	47	63	9
10	2384	4652	2856	2216	4605	2835	2048	4554	2812	1882	4502	2788	1717	4446	2763	10
11	81	51	56	13	04	35	46	54	12	79	01	88	14	45	62	11
12	78	50	56	10	03	34	43	53	12	77	00	87	11	44	62	12
13	75	49	56	07	02	34	40	52	11	74	4499	87	09	43	61	13
14	72	49	55	05	01	34	37	51	11	71	98	87	06	42	61	14
15	70	48	55	02	00	33	35	50	10	68	97	86	03	41	60	15
16	67	47	54	2199	00	33	32	49	10	66	96	86	00	40	60	16
17	64	46	54	96	4599	32	29	48	10	63	95	85	1698	39	60	17
18	61	46	54	93	98	32	26	48	09	60	94	85	95	38	59	18
19	58	45	53	91	97	32	23	47	09	57	93	84	92	37	59	19
20	2356	4644	2853	2188	4596	2831	2021	4546	2808	1855	4492	2784	1689	4436	2758	20
21	53	43	53	85	96	31	18	45	08	52	92	84	87	35	58	21
22	50	42	52	82	95	31	15	44	08	49	91	83	84	34	57	22
23	47	42	52	79	94	30	12	43	07	46	90	83	81	33	57	23
24	44	41	51	77	93	30	10	42	07	44	89	82	78	32	56	24
25	42	40	51	74	92	30	07	42	06	41	88	82	76	31	56	25
26	39	39	51	71	91	29	04	41	06	38	87	82	73	30	56	26
27	36	39	50	68	91	29	01	40	06	35	86	81	70	29	55	27
28	33	38	50	65	00	28	1998	39	05	32	85	81	67	28	55	28
29	30	37	50	63	89	28	96	38	05	30	84	80	65	27	54	29
30	2328	4636	2849	2160	4588	2828	1993	4537	2804	1827	4483	2780	1662	4426	2754	30
31	25	36	49	57	87	27	90	36	04	24	82	79	59	25	53	31
32	22	35	49	54	87	27	87	35	04	21	81	79	56	24	53	32
33	19	34	48	51	86	27	85	35	03	19	80	79	54	23	52	33
34	16	33	48	49	85	26	82	34	03	16	80	78	51	23	52	34
35	14	32	48	46	84	26	79	33	02	13	79	78	48	22	52	35
36	11	32	47	43	83	25	76	32	02	10	78	77	45	21	51	36
37	08	31	47	40	82	25	74	31	02	08	77	77	43	20	51	37
38	05	30	47	38	82	25	71	30	01	05	76	76	40	19	50	38
39	02	29	46	35	81	24	68	29	01	02	75	76	37	18	50	39
40	2300	4628	2846	2132	4580	2824	1965	4528	2800	1799	4474	2776	1635	4417	2749	40
41	2297	28	45	29	79	24	62	27	00	97	73	75	32	16	49	41
42	94	27	45	26	78	23	60	27	00	94	72	75	29	15	48	42
43	91	26	45	24	77	23	57	26	2799	91	71	74	26	14	48	43
44	88	25	44	21	77	22	54	25	99	88	70	74	24	13	47	44
45	86	25	44	18	76	22	51	24	98	86	69	73	21	12	47	45
46	83	24	44	15	75	22	49	23	98	83	68	73	18	11	47	46
47	80	23	43	12	74	21	46	22	98	80	67	73	15	10	46	47
48	77	22	43	10	73	21	43	21	97	77	66	72	13	09	46	48
49	74	21	43	07	72	20	40	20	97	75	66	72	10	08	45	49
50	2272	4621	2842	2104	4572	2820	1938	4520	2796	1772	4465	2771	1607	4407	2745	50
51	69	20	42	01	71	20	35	19	96	69	64	71	04	06	44	51
52	66	19	42	2099	70	19	32	18	96	66	63	70	02	05	44	52
53	63	18	41	96	69	19	29	17	95	64	62	70	1599	04	43	53
54	60	17	41	93	68	19	26	16	95	61	61	70	96	03	43	54
55	58	17	41	90	67	18	24	15	94	58	60	69	93	02	42	55
56	55	16	40	87	66	18	21	14	94	55	59	69	91	01	42	56
57	52	15	40	85	66	17	18	13	94	53	58	68	88	00	42	57
58	49	14	39	82	65	17	15	12	93	50	57	68	85	4399	41	58
59	46	13	39	79	64	17	13	11	93	47	56	67	83	98	41	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	20°			21°			22°			23°			24°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	1580	4397	2740	1416	4336	2712	1254	4272	2682	1093	4205	2651	0933	4135	2618	0
1	77	96	40	14	35	11	51	71	81	90	04	50	30	34	17	1
2	74	95	39	11	34	11	49	70	81	87	03	49	27	33	16	2
3	72	94	39	08	33	10	46	69	80	85	02	49	25	32	16	3
4	69	93	38	05	32	10	43	67	80	82	00	48	22	31	15	4
5	66	92	38	03	31	09	40	66	79	79	4199	48	19	30	15	5
6	63	91	37	00	30	09	38	65	79	77	98	47	17	28	14	6
7	61	90	37	1397	28	08	35	64	78	74	97	47	14	27	14	7
8	58	89	36	95	27	08	32	63	78	71	96	46	11	26	13	8
9	55	88	36	92	26	07	30	62	77	69	95	46	09	25	13	9
10	1552	4387	2736	1389	4325	2707	1227	4261	2677	1066	4194	2645	0906	4124	2612	10
11	50	86	35	86	24	06	24	60	76	63	92	45	03	22	11	11
12	47	85	35	84	23	06	22	59	76	61	91	44	01	21	11	12
13	44	84	34	81	22	05	19	58	75	58	90	44	0898	20	10	13
14	42	83	34	78	21	05	16	57	75	55	89	43	95	19	10	14
15	39	82	33	76	20	04	14	55	74	53	88	42	93	18	09	15
16	36	81	33	73	19	04	11	54	74	50	87	42	90	16	09	16
17	33	80	32	70	18	04	08	53	73	47	86	41	88	15	08	17
18	31	79	32	67	17	03	05	52	73	45	84	41	85	14	07	18
19	28	78	31	65	16	03	03	51	72	42	83	40	82	13	07	19
20	1525	4377	2731	1362	4315	2702	1200	4250	2672	1039	4182	2640	0880	4112	2606	20
21	22	76	30	59	14	02	1197	49	71	37	81	39	77	10	06	21
22	20	75	30	57	13	01	95	48	71	34	80	39	74	09	05	22
23	17	74	29	54	12	01	92	47	70	31	79	38	72	08	05	23
24	14	73	29	51	11	00	89	45	70	29	78	38	69	07	04	24
25	12	72	29	49	09	00	87	44	69	26	76	37	66	06	03	25
26	09	71	28	46	08	2699	84	43	69	23	75	36	64	04	03	26
27	06	70	28	43	07	99	81	42	68	21	74	36	61	03	02	27
28	03	69	27	40	06	98	79	41	67	18	73	35	58	02	02	28
29	01	68	27	38	05	98	76	40	67	15	72	35	56	01	01	29
30	1498	4367	2726	1335	4304	2697	1173	4239	2666	1013	4171	2634	0853	4100	2601	30
31	95	66	26	32	03	97	70	38	65	10	69	34	50	4098	00	31
32	92	65	25	30	02	96	68	37	65	07	68	33	48	97	2599	32
33	90	64	25	27	01	96	65	35	65	05	67	33	45	96	99	33
34	87	63	24	24	00	95	62	34	64	02	66	32	42	95	98	34
35	84	62	24	21	4299	95	60	33	64	0999	65	32	40	94	98	35
36	82	61	23	19	98	94	57	32	63	97	64	31	37	92	97	36
37	79	60	23	16	97	94	54	31	63	94	62	30	35	91	96	37
38	76	59	22	13	96	93	52	30	62	91	61	30	32	90	96	38
39	73	58	22	11	95	93	49	29	62	89	60	29	29	89	95	39
40	1471	4356	2721	1308	4293	2692	1146	4228	2661	0986	4159	2629	0827	4088	2595	40
41	68	55	21	05	92	92	44	26	61	83	58	28	24	86	94	41
42	65	54	20	03	91	91	41	25	60	81	57	28	21	85	94	42
43	63	53	20	00	90	91	38	24	60	78	55	27	19	84	93	43
44	60	52	20	1297	89	90	36	23	59	75	54	27	16	83	92	44
45	57	51	19	94	88	90	33	22	59	73	53	26	13	81	92	45
46	54	50	19	92	87	89	30	21	58	70	52	25	11	80	91	46
47	52	49	18	89	86	89	28	20	57	67	51	25	08	79	91	47
48	49	48	18	86	85	88	25	19	57	65	50	24	05	78	90	48
49	46	47	17	84	84	88	22	17	56	62	48	24	03	77	90	49
50	1443	4346	2717	1281	4283	2687	1119	4216	2656	0959	4147	2623	0800	4075	2589	50
51	41	45	16	78	82	87	17	15	55	57	46	23	0798	74	88	51
52	38	44	16	76	81	86	14	14	55	54	45	22	95	73	88	52
53	35	43	15	73	79	86	11	13	54	51	44	21	92	72	87	53
54	33	42	15	70	78	85	09	12	54	49	43	21	90	70	87	54
55	30	41	14	67	77	85	06	11	53	46	41	20	87	69	86	55
56	27	40	14	65	76	84	03	10	53	43	40	20	84	68	85	56
57	24	39	13	62	75	83	01	08	52	41	39	19	82	67	85	57
58	22	38	13	59	74	83	1098	07	52	38	38	19	79	66	84	58
59	19	37	12	57	73	82	95	06	51	35	37	18	76	64	84	59

Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	25°			26°			27°			28°			29°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	0774	4063	2583	0616	3988	2547	0460	3910	2509	0305	3829	2470	0152	3746	2428	0
1	71	62	82	14	87	46	58	09	09	03	28	69	49	45	28	1
2	69	61	82	11	85	46	55	07	08	00	27	68	47	43	27	2
3	66	59	81	08	84	45	52	06	07	0298	25	68	44	42	26	3
4	63	58	81	06	83	44	50	05	07	95	24	67	42	41	26	4
5	61	57	80	03	82	44	47	03	06	92	23	66	39	39	25	5
6	58	56	80	01	80	43	45	02	05	90	21	66	37	38	24	6
7	55	54	79	0598	79	43	42	01	05	87	20	65	34	36	24	7
8	53	53	78	95	78	42	39	3899	04	85	19	64	32	35	23	8
9	50	52	78	93	76	41	37	98	03	82	17	64	29	33	22	9
10	0747	4051	2577	0590	3975	2541	0434	3897	2503	0280	3816	2463	0126	3732	2421	10
11	45	50	77	88	74	40	32	95	02	77	14	62	24	31	21	11
12	42	48	76	85	73	39	29	94	01	74	13	62	21	29	20	12
13	40	47	75	82	71	39	26	93	01	72	12	61	19	28	19	13
14	37	46	75	80	70	38	24	91	00	69	10	60	16	26	19	14
15	34	45	74	77	69	38	21	90	2499	67	09	60	14	25	18	15
16	32	43	74	75	67	37	19	89	99	64	08	59	11	24	17	16
17	29	42	73	72	66	36	16	88	98	62	06	58	09	22	16	17
18	26	41	72	69	65	36	14	86	97	59	05	57	06	21	16	18
19	24	40	72	67	64	35	11	85	97	57	03	57	04	19	15	19
20	0721	4038	2571	0564	3962	2534	0408	3883	2496	0254	3802	2456	0101	3718	2414	20
21	19	37	71	61	61	34	06	82	95	51	01	55	0099	16	14	21
22	16	36	70	59	60	33	03	81	95	49	3799	55	96	15	13	22
23	13	35	69	56	58	33	01	79	94	46	98	54	94	14	12	23
24	11	33	69	54	57	32	0398	78	94	44	96	53	91	12	12	24
25	08	32	68	51	56	31	95	77	93	41	95	53	88	11	11	25
26	05	31	68	48	54	31	93	75	92	39	94	52	86	09	10	26
27	03	30	67	46	53	30	90	74	92	36	92	51	83	08	09	27
28	00	28	66	43	52	29	88	73	91	34	91	51	81	06	09	28
29	0698	27	66	41	51	29	85	71	90	31	90	50	78	05	08	29
30	0695	4026	2565	0538	3949	2528	0383	3870	2490	0228	3788	2449	0076	3704	2407	30
31	92	25	65	35	48	28	80	69	89	26	87	49	73	02	07	31
32	90	23	64	33	47	27	77	67	88	23	85	48	71	01	06	32
33	87	22	63	30	45	26	75	66	88	21	84	47	68	3699	05	33
34	84	21	63	28	44	26	72	65	87	18	83	47	66	98	04	34
35	82	20	62	25	43	25	70	63	86	16	81	46	63	96	04	35
36	79	18	62	22	42	24	67	62	86	13	80	45	61	95	03	36
37	77	17	61	20	40	24	64	61	85	11	78	44	58	94	02	37
38	74	16	60	17	39	23	62	59	84	08	77	44	56	92	02	38
39	71	15	60	15	38	23	59	58	84	05	76	43	53	91	01	39
40	0669	4013	2559	0512	3936	2522	0357	3857	2483	0203	3774	2442	0050	3689	2400	40
41	66	12	59	09	35	21	54	55	82	00	73	42	48	88	2399	41
42	63	11	58	07	34	21	52	54	82	0198	71	41	45	86	99	42
43	61	10	57	04	32	20	49	53	81	95	70	40	43	85	98	43
44	58	08	57	02	31	19	46	51	80	93	69	40	40	83	97	44
45	56	07	56	0499	30	19	44	50	80	90	67	39	38	82	96	45
46	53	06	55	96	28	18	41	49	79	88	66	38	35	81	96	46
47	50	04	55	94	27	17	39	47	78	85	64	38	33	79	95	47
48	48	03	54	91	26	17	36	46	78	82	63	37	30	78	94	48
49	45	02	54	89	25	16	34	44	77	80	62	36	28	76	94	49
50	0642	4001	2553	0486	3923	2516	0331	3843	2476	0177	3760	2435	0025	3675	2393	50
51	40	3999	52	83	22	15	28	42	76	75	59	35	23	73	92	51
52	37	98	52	81	21	14	26	40	75	72	57	34	20	72	91	52
53	35	97	51	78	19	14	23	39	74	70	56	33	18	70	91	53
54	32	96	51	76	18	13	21	38	74	67	55	33	15	69	90	54
55	29	94	50	73	17	12	18	36	73	65	53	32	13	68	89	55
56	27	93	49	70	15	12	16	35	72	62	52	31	10	66	88	56
57	24	92	49	68	14	11	13	34	72	60	50	31	08	65	88	57
58	22	90	48	65	13	10	10	32	71	57	49	30	05	63	87	58
59	19	89	48	63	11	10	08	31	70	54	48	29	03	62	86	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	30°			31°			32°			33°			34°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	0000	3660	2386	9850	3572	2341	9701	3480	2294	9554	3387	2246	9408	3290	2196	0
1	9997	59	85	47	70	40	9698	79	94	51	85	45	06	89	95	1
2	95	57	84	45	69	39	96	77	93	49	84	45	03	87	94	2
3	92	56	83	42	67	39	93	76	92	46	82	44	01	85	93	3
4	90	54	83	40	66	38	91	74	91	44	80	43	9398	84	93	4
5	87	53	82	37	64	37	88	73	91	41	79	42	96	82	92	5
6	85	52	81	35	63	36	86	71	90	39	77	41	94	81	91	6
7	82	50	80	32	61	36	84	70	89	37	76	40	91	79	90	7
8	80	49	80	30	60	35	81	68	88	34	74	40	89	77	89	8
9	77	47	79	27	58	34	79	67	87	32	72	39	86	76	88	9
10	9975	3646	2378	9825	3557	2333	9676	3465	2287	9529	3371	2238	9384	3274	2187	10
11	72	44	78	22	55	33	74	63	86	27	69	37	82	72	87	11
12	70	43	77	20	54	32	71	62	85	24	68	36	79	71	86	12
13	67	41	76	17	52	31	69	60	84	22	66	35	77	69	85	13
14	65	40	75	15	51	30	66	59	83	20	64	35	74	68	84	14
15	62	38	75	12	49	30	64	57	83	17	63	34	72	66	83	15
16	60	37	74	10	48	29	61	56	82	15	61	33	70	64	82	16
17	57	35	73	07	46	28	59	54	81	12	60	32	67	63	81	17
18	55	34	72	05	45	27	56	53	80	10	58	31	65	61	81	18
19	52	32	72	02	43	26	54	51	79	07	56	31	62	59	80	19
20	9950	3631	2371	9800	3542	2326	9652	3450	2279	9505	3355	2230	9360	3258	2179	20
21	47	30	70	9797	40	25	49	48	78	02	53	29	58	56	78	21
22	45	28	69	95	39	24	47	46	77	00	52	28	55	54	77	22
23	42	27	69	92	37	23	44	45	76	9498	50	27	53	53	76	23
24	40	25	68	90	36	23	42	43	75	95	48	26	50	51	75	24
25	37	24	67	87	34	22	39	42	75	93	47	26	48	49	75	25
26	35	22	66	85	32	21	37	40	74	90	45	25	46	48	74	26
27	32	21	66	82	31	20	34	39	73	88	44	24	43	46	73	27
28	30	19	65	80	29	20	32	37	72	85	42	23	41	45	72	28
29	27	18	64	77	28	19	29	35	71	83	40	22	38	43	71	29
30	9925	3616	2363	9775	3526	2318	9627	3434	2271	9481	3339	2221	9336	3241	2170	30
31	22	15	63	73	25	17	25	32	70	78	37	21	34	40	69	31
32	20	13	62	70	23	16	22	31	69	76	36	20	31	38	68	32
33	17	12	61	68	22	16	20	29	68	73	34	19	29	36	68	33
34	15	10	61	65	20	15	17	28	67	71	32	18	26	35	67	34
35	12	09	60	63	19	14	15	26	67	69	31	17	24	33	66	35
36	10	07	59	60	17	13	12	25	66	66	29	16	22	31	65	36
37	07	06	58	58	16	13	10	23	65	64	28	15	19	30	64	37
38	05	04	58	55	14	12	07	21	64	61	26	15	17	28	63	38
39	02	03	57	53	13	11	05	20	63	59	24	14	14	26	62	39
40	9900	3601	2356	9750	3511	2310	9602	3418	2262	9456	3323	2213	9312	3225	2162	40
41	9897	00	55	48	10	09	00	17	62	54	21	12	10	23	61	41
42	95	3599	55	45	08	09	9598	15	61	52	20	11	07	21	60	42
43	92	97	54	43	07	08	95	14	60	49	18	10	05	20	59	43
44	90	96	53	40	05	07	93	12	59	47	16	10	02	18	58	44
45	87	94	52	38	04	06	90	10	58	44	15	09	00	16	57	45
46	85	93	52	35	02	06	88	09	58	42	13	08	9298	15	56	46
47	82	91	51	33	00	05	85	07	57	39	11	07	95	13	55	47
48	80	90	50	30	3499	04	83	06	56	37	10	06	93	11	55	48
49	77	88	49	28	97	03	80	04	55	35	08	05	90	10	54	49
50	9875	3587	2349	9726	3496	2302	9578	3403	2254	9432	3307	2205	9288	3208	2153	50
51	72	85	48	23	94	02	76	01	54	30	05	04	86	07	52	51
52	70	84	47	21	93	01	73	3399	53	27	03	03	83	05	51	52
53	67	82	46	18	91	00	71	98	52	25	02	02	81	03	50	53
54	65	81	45	16	90	2299	68	96	51	23	00	01	79	02	49	54
55	62	79	45	13	88	98	66	95	50	20	3298	00	76	00	48	55
56	60	78	44	11	87	98	63	93	49	18	97	2199	74	3198	47	56
57	57	76	43	08	85	97	61	91	49	15	95	99	71	97	47	57
58	55	75	42	06	84	96	58	90	48	13	94	98	69	95	46	58
59	52	73	42	03	82	95	56	88	47	10	92	97	67	93	45	59

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Altura — Somma ou differença — Logarithmos de latitude e declinação

T. X)

′	35°			36°			37°			38°			39°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	9264	3192	2144	9122	3090	2090	8982	2986	2034	8843	2880	1976	8707	2771	1915	0
1	62	90	43	20	88	89	80	85	33	41	78	75	05	70	14	1
2	59	88	42	17	87	88	77	83	32	39	77	74	02	68	13	2
3	57	87	41	15	85	87	75	81	31	37	75	73	00	66	12	3
4	55	85	40	13	83	86	73	79	30	34	73	72	8698	64	11	4
5	52	83	40	10	82	85	70	78	29	32	71	71	96	62	10	5
6	50	81	39	08	80	84	68	76	28	30	69	70	93	60	09	6
7	48	80	38	06	78	83	66	74	27	27	68	69	91	59	08	7
8	45	78	37	03	76	83	63	72	26	25	66	68	89	57	07	8
9	43	76	36	01	75	82	61	71	25	23	64	67	86	55	06	9
10	9240	3175	2135	9099	3073	2081	8959	2969	2024	8820	2862	1966	8684	2753	1905	10
11	38	73	34	96	71	80	56	67	23	18	60	65	82	51	04	11
12	36	71	33	94	70	79	54	65	22	16	59	64	80	49	03	12
13	33	70	32	92	68	78	52	64	21	14	57	63	77	48	02	13
14	31	68	32	89	66	77	49	62	20	11	55	62	75	46	01	14
15	29	66	31	87	64	76	47	60	19	09	53	61	73	44	00	15
16	26	65	30	85	63	75	45	58	18	07	51	60	71	42	1899	16
17	24	63	29	82	61	74	42	56	18	04	50	59	68	40	98	17
18	21	61	28	80	59	73	40	55	17	02	48	58	66	38	97	18
19	19	60	27	78	58	72	38	53	16	00	46	57	64	37	96	19
20	9217	3158	2126	9075	3056	2071	8935	2951	2015	8798	2844	1956	8662	2735	1895	20
21	14	56	25	73	54	70	33	49	14	95	42	55	59	33	94	21
22	12	55	24	70	52	70	31	48	13	93	41	54	57	31	93	22
23	10	53	23	68	51	69	29	46	12	91	39	53	55	29	92	23
24	07	51	23	66	49	68	26	44	11	89	37	52	53	27	91	24
25	05	50	22	63	47	67	24	42	10	86	35	51	50	25	90	25
26	02	48	21	61	45	66	22	41	09	84	33	50	48	24	89	26
27	00	46	20	59	44	65	19	39	08	82	32	49	46	22	87	27
28	9198	45	19	56	42	64	17	37	07	79	30	48	44	20	86	28
29	95	43	18	54	40	63	15	35	06	77	28	47	41	18	85	29
30	9193	3141	2117	9052	3039	2062	8912	2934	2005	8775	2826	1946	8639	2716	1884	30
31	91	39	16	49	37	61	10	32	04	73	24	45	37	14	83	31
32	88	38	15	47	35	60	08	30	03	70	22	44	35	13	82	32
33	86	36	14	45	33	59	05	28	02	68	21	43	32	11	81	33
34	84	34	14	42	32	58	03	26	01	66	19	42	30	09	80	34
35	81	33	13	40	30	57	01	25	00	63	17	41	28	07	79	35
36	79	31	12	38	28	56	8899	23	1999	61	15	40	26	05	78	36
37	76	29	11	35	26	56	96	21	98	59	13	39	24	03	77	37
38	74	28	10	33	25	55	94	19	97	57	12	38	21	01	76	38
39	72	26	09	31	23	54	92	18	96	54	10	37	19	00	75	39
40	9169	3124	2108	9028	3021	2053	8889	2916	1995	8752	2808	1936	8617	2698	1874	40
41	67	23	07	26	19	52	87	14	94	50	06	35	15	96	73	41
42	65	21	06	24	18	51	85	12	93	48	04	34	12	94	72	42
43	62	19	05	21	16	50	82	10	92	45	02	33	10	92	71	43
44	60	17	04	19	14	49	80	09	91	43	01	32	08	90	70	44
45	58	16	04	17	13	48	78	07	90	41	2799	31	06	88	69	45
46	55	14	03	14	11	47	76	05	89	39	97	30	03	87	68	46
47	53	12	02	12	09	46	73	03	88	36	95	29	01	85	67	47
48	50	11	01	10	07	45	71	02	87	34	93	28	8599	83	66	48
49	48	09	00	07	06	44	69	00	86	32	92	27	97	81	64	49
50	9146	3107	2099	9005	3004	2043	8866	2898	1985	8729	2790	1926	8594	2679	1863	50
51	43	06	98	03	02	42	64	96	84	27	88	25	92	77	62	51
52	41	04	97	00	00	41	62	94	83	25	86	23	90	75	61	52
53	39	02	96	8998	2999	40	59	93	83	23	84	22	88	74	60	53
54	36	00	95	96	97	39	57	91	82	20	82	21	86	72	59	54
55	34	3099	94	93	95	39	55	89	81	18	81	20	83	70	58	55
56	32	97	94	91	93	38	53	87	80	16	79	19	81	68	57	56
57	29	95	93	89	92	37	50	85	79	14	77	18	79	66	56	57
58	27	94	92	87	90	36	48	84	78	11	75	17	77	64	55	58

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	40°			41°			42°			43°			44°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	8572	2660	1853	8439	2547	1788	8309	2431	1721	8180	2314	1652	8053	2193	1580	0
1	70	59	52	37	45	87	07	29	20	78	12	50	51	91	78	1
2	68	57	51	35	43	86	04	28	19	76	10	49	49	89	77	2
3	65	55	50	33	41	85	02	26	18	74	08	48	47	87	76	3
4	63	53	49	31	39	84	00	24	16	72	06	47	45	85	75	4
5	61	51	48	28	38	83	8298	22	15	69	04	46	43	83	74	5
6	59	49	46	26	36	81	96	20	14	67	02	44	41	81	72	6
7	57	47	45	24	34	80	94	18	13	65	00	43	39	79	71	7
8	54	45	44	22	32	79	91	16	12	63	2298	42	37	77	70	8
9	52	44	43	20	30	78	89	14	11	61	96	41	35	75	69	9
10	8550	2642	1842	8417	2528	1777	8287	2412	1710	8159	2294	1640	8033	2173	1567	10
11	48	40	41	15	26	76	85	10	08	57	92	39	30	71	66	11
12	45	38	40	13	24	75	83	08	07	55	90	37	28	69	65	12
13	43	36	39	11	22	74	81	06	06	52	88	36	26	67	64	13
14	41	34	38	09	20	73	78	04	05	50	86	35	24	65	62	14
15	39	32	37	07	18	72	76	02	04	48	84	34	22	63	61	15
16	37	30	36	04	16	70	74	00	03	46	82	33	20	61	60	16
17	34	29	35	02	15	69	72	2398	02	44	80	31	18	59	59	17
18	32	27	34	00	13	68	70	96	00	42	78	30	16	57	58	18
19	30	25	33	8398	11	67	68	94	1699	40	76	29	14	55	56	19
20	8528	2623	1832	8396	2509	1766	8266	2392	1698	8138	2274	1628	8012	2153	1555	20
21	25	21	30	93	07	65	63	90	97	35	72	27	10	51	54	21
22	23	19	29	91	05	64	61	88	96	33	70	25	08	49	53	22
23	21	17	28	89	03	63	59	87	95	31	68	24	05	47	51	23
24	19	15	27	87	01	62	57	85	94	29	66	23	03	45	50	24
25	17	13	26	85	2499	60	55	83	92	27	64	22	01	43	49	25
26	14	12	25	83	97	59	53	81	91	25	62	21	7999	41	48	26
27	12	10	24	80	95	58	51	79	90	23	60	20	97	39	46	27
28	10	08	23	78	93	57	48	77	89	21	58	18	95	37	45	28
29	08	06	22	76	91	56	46	75	88	19	56	17	93	35	44	29
30	8506	2604	1821	8374	2490	1755	8244	2373	1687	8116	2254	1616	7991	2132	1543	30
31	03	02	20	72	88	54	42	71	85	14	52	15	89	30	41	31
32	01	00	19	69	86	53	40	69	84	12	50	14	87	28	40	32
33	8499	2598	18	67	84	52	38	67	83	10	48	12	85	26	39	33
34	97	96	16	65	82	50	36	65	82	08	46	11	83	24	38	34
35	94	95	15	63	80	49	33	63	81	06	44	10	81	22	36	35
36	92	93	14	61	78	48	31	61	80	04	42	09	78	20	35	36
37	90	91	13	59	76	47	29	59	78	02	40	08	76	18	34	37
38	88	89	12	56	74	46	27	57	77	00	38	06	74	16	33	38
39	86	87	11	54	72	45	25	55	76	8097	36	05	72	14	32	39
40	8483	2585	1810	8352	2470	1744	8223	2353	1675	8095	2234	1604	7970	2112	1530	40
41	81	83	09	50	68	43	21	51	74	93	32	03	68	10	29	41
42	79	81	08	48	66	41	18	49	73	91	30	01	66	08	28	42
43	77	79	07	46	64	40	16	47	71	89	28	00	64	06	27	43
44	75	78	06	43	63	39	14	45	70	87	26	1599	62	04	25	44
45	72	76	04	41	61	38	12	43	69	85	24	98	60	02	24	45
46	70	74	03	39	59	37	10	41	68	83	22	97	58	00	23	46
47	68	72	02	37	57	36	08	39	67	81	20	95	56	2098	22	47
48	66	70	01	35	55	35	06	37	66	79	18	94	54	96	20	48
49	64	68	00	33	53	34	03	35	64	76	16	93	52	94	19	49
50	8461	2566	1799	8330	2451	1732	8201	2333	1663	8074	2214	1592	7950	2092	1518	50
51	59	64	98	28	49	31	8199	31	62	72	12	91	47	90	16	51
52	57	62	97	26	47	30	97	29	61	70	10	89	45	87	15	52
53	55	60	96	24	45	29	95	27	60	68	08	88	43	85	14	53
54	53	59	95	22	43	28	93	25	59	66	06	87	41	83	13	54
55	50	57	94	20	41	27	91	23	57	64	03	86	39	81	11	55
56	48	55	92	17	39	26	89	21	56	62	01	84	37	79	10	56
57	46	53	91	15	37	24	86	19	55	60	2199	83	35	77	09	57
58	44	51	90	13	35	23	84	17	54	58	97	82	33	75	08	58
59	42	49	89	11	33	22	82	16	53	56	95	81	31	73	06	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	45°			46°			47°			48°			49°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	7929	2071	1505	7807	1947	1428	7686	1820	1348	7569	1691	1265	7453	1561	1180	0
1	27	69	04	05	44	27	84	18	47	67	89	64	51	58	78	1
2	25	67	03	03	42	25	83	16	45	65	87	63	49	56	77	2
3	23	65	01	01	40	24	81	14	44	63	85	61	47	54	75	3
4	21	63	00	7799	38	23	79	11	43	61	83	60	45	52	74	4
5	19	61	1499	97	36	21	77	09	41	59	80	58	43	50	72	5
6	17	59	98	94	34	20	75	07	40	57	78	57	41	47	71	6
7	15	57	96	92	32	19	73	05	39	55	76	56	40	45	70	7
8	13	55	95	90	30	18	71	03	37	53	74	54	38	43	68	8
9	10	53	94	88	28	16	69	01	36	51	72	53	36	41	67	9
10	7908	2050	1492	7786	1926	1415	7667	1799	1335	7549	1670	1251	7434	1539	1165	10
11	06	48	91	84	24	14	65	97	33	47	67	50	32	36	64	11
12	04	46	90	82	21	12	63	94	32	45	65	49	30	34	62	12
13	02	44	89	80	19	11	61	92	30	43	63	47	28	32	61	13
14	00	42	87	78	17	10	59	90	29	41	61	46	26	30	59	14
15	7898	40	86	76	15	08	57	88	28	39	59	44	24	28	58	15
16	96	38	85	74	13	07	55	86	26	37	57	43	22	25	56	16
17	94	36	84	72	11	06	53	84	25	36	54	41	21	23	55	17
18	92	34	82	70	09	04	51	82	24	34	52	40	19	21	53	18
19	90	32	81	68	07	03	49	79	22	32	50	39	17	19	52	19
20	7888	2030	1480	7766	1905	1402	7647	1777	1321	7530	1648	1237	7415	1517	1150	20
21	86	28	78	64	03	00	45	75	20	28	46	36	13	14	49	21
22	84	26	77	62	00	1399	43	73	18	26	44	34	11	12	48	22
23	82	24	76	60	1898	98	41	71	17	24	41	33	09	10	46	23
24	80	22	75	58	96	96	39	69	15	22	39	31	07	08	45	24
25	78	19	73	56	94	95	37	67	14	20	37	30	05	06	43	25
26	76	17	72	54	92	94	35	64	13	18	35	29	04	03	42	26
27	74	15	71	52	90	92	33	62	11	16	33	27	02	01	40	27
28	72	13	69	50	88	91	31	60	10	14	31	26	00	1499	39	28
29	70	11	68	48	86	90	29	58	09	12	28	24	7398	97	37	29
30	7868	2009	1467	7746	1884	1388	7627	1756	1307	7510	1626	1223	7396	1494	1136	30
31	65	07	66	44	81	87	25	54	06	09	24	22	94	92	34	31
32	63	05	64	42	79	86	23	52	04	07	22	20	92	90	33	32
33	61	03	63	40	77	84	21	49	03	05	20	19	90	88	31	33
34	59	01	62	38	75	83	19	47	02	03	17	17	88	86	30	34
35	57	1999	60	36	73	82	17	45	00	01	15	16	87	83	28	35
36	55	97	59	34	71	80	15	43	1299	7499	13	14	85	81	27	36
37	53	95	58	32	69	79	13	41	97	97	11	13	83	79	25	37
38	51	92	57	30	67	78	12	39	96	95	09	11	81	77	24	38
39	49	90	55	28	65	76	10	37	95	93	07	10	79	75	22	39
40	7847	1988	1454	7726	1862	1375	7608	1734	1293	7491	1604	1209	7377	1472	1121	40
41	45	86	53	24	60	74	06	32	92	89	02	07	75	70	19	41
42	43	84	51	22	58	72	04	30	91	87	00	06	73	68	18	42
43	41	82	50	20	56	71	02	28	89	85	1598	04	71	66	16	43
44	39	80	49	18	54	70	00	26	88	84	96	03	70	63	15	44
45	37	78	48	16	52	68	7598	24	86	82	93	01	68	61	13	45
46	35	76	46	14	50	67	96	22	85	80	91	00	66	59	12	46
47	33	74	45	12	48	66	94	19	84	78	89	1199	64	57	10	47
48	31	72	44	10	45	64	92	17	82	76	87	97	62	55	09	48
49	29	70	42	08	43	63	90	15	81	74	85	96	60	52	07	49
50	7827	1967	1441	7706	1841	1362	7588	1713	1270	7472	1583	1194	7358	1450	1106	50
51	25	65	40	04	39	60	86	11	78	70	80	93	56	48	04	51
52	23	63	38	02	37	59	84	09	77	68	78	91	55	46	03	52
53	21	61	37	00	35	58	82	06	75	66	76	90	53	43	01	53
54	19	59	36	7698	33	56	80	04	74	64	74	88	51	41	00	54
55	17	57	35	96	31	55	78	02	72	62	72	87	49	39	1098	55
56	15	55	33	94	28	54	76	00	71	61	69	86	47	37	97	56
57	13	53	32	92	26	52	74	1698	70	59	67	84	45	35	95	57
58	11	51	31	90	24	51	72	96	68	57	65	83	43	32	94	58
59	09	49	29	88	22	49	71	93	67	55	63	81	41	30	92	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	50°			51°			52°			53°			54°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	7340	1428	1091	7229	1293	0999	7120	1157	0904	7014	1018	0805	6910	0878	0702	0
1	38	26	89	27	91	97	18	54	02	12	16	03	08	75	01	1
2	36	23	88	25	89	96	16	52	00	10	13	02	06	73	0699	2
3	34	21	86	23	86	94	15	50	0899	08	11	00	05	71	97	3
4	32	19	85	21	84	93	13	47	97	07	09	0798	03	68	96	4
5	30	17	83	19	82	91	11	45	96	05	07	97	01	66	94	5
6	28	14	82	18	80	90	09	43	94	03	04	95	00	64	92	6
7	26	12	80	16	77	88	07	41	92	01	02	93	6898	61	90	7
8	25	10	79	14	75	87	06	38	91	00	00	91	96	59	89	8
9	23	08	77	12	73	85	04	36	89	6998	0997	90	94	57	87	9
10	7321	1406	1076	7210	1271	0983	7102	1134	0887	6996	0995	0788	6893	0854	0685	10
11	19	03	74	08	68	82	00	31	86	94	93	86	91	52	83	11
12	17	01	73	07	66	80	7098	29	84	93	90	85	89	50	82	12
13	15	1399	71	05	64	79	97	27	83	91	88	83	88	47	80	13
14	13	97	70	03	61	77	95	24	81	89	86	81	86	45	78	14
15	12	94	68	01	59	76	93	22	79	87	83	80	84	42	76	15
16	10	92	67	7199	57	74	91	20	78	86	81	78	83	40	75	16
17	08	90	65	98	55	72	90	18	76	84	79	76	81	38	73	17
18	06	88	64	96	52	71	88	15	74	82	76	75	79	35	71	18
19	04	85	62	94	50	69	86	13	73	81	74	73	77	33	69	19
20	7302	1383	1061	7192	1248	0968	7084	1111	0871	6979	0972	0771	6876	0831	0667	20
21	00	81	59	90	46	66	82	08	70	77	69	69	74	28	66	21
22	7299	79	58	88	43	64	81	06	68	75	67	68	72	26	64	22
23	97	76	56	87	41	63	79	04	66	74	65	66	71	24	62	23
24	95	74	55	85	39	61	77	01	65	72	62	64	69	21	60	24
25	93	72	53	83	37	60	75	1099	63	70	60	63	67	19	59	25
26	91	70	52	81	34	58	74	97	61	68	58	61	66	16	57	26
27	89	68	50	79	32	57	72	95	60	67	55	59	64	14	55	27
28	87	65	48	78	30	55	70	92	58	65	53	58	62	12	53	28
29	86	63	47	76	27	53	68	90	56	63	51	56	61	09	52	29
30	7284	1361	1045	7174	1225	0952	7066	1088	0855	6961	0948	0754	6859	0807	0650	30
31	82	59	44	72	23	50	65	85	53	60	46	52	57	05	48	31
32	80	56	42	70	21	49	63	83	51	58	44	51	55	02	46	32
33	78	54	41	68	18	47	61	81	50	56	41	49	54	00	45	33
34	76	52	39	67	16	45	59	78	48	55	39	47	52	0798	43	34
35	75	50	38	65	14	44	58	76	47	53	37	46	50	95	41	35
36	73	47	36	63	11	42	56	74	45	51	34	44	49	93	39	36
37	71	45	35	61	09	41	54	71	43	49	32	42	47	90	37	37
38	69	43	33	59	07	39	52	69	42	48	30	40	45	88	36	38
39	67	41	32	58	05	37	51	67	40	46	27	39	44	86	34	39
40	7265	1338	1030	7156	1202	0936	7049	1065	0838	6944	0925	0737	6842	0783	0632	40
41	63	36	28	54	00	34	47	62	37	42	22	35	40	81	30	41
42	62	34	27	52	1198	33	45	60	35	41	20	34	39	79	29	42
43	60	32	25	50	96	31	44	58	33	39	18	32	37	76	27	43
44	58	29	24	49	93	29	42	55	32	37	15	30	35	74	25	44
45	56	27	22	47	91	28	40	53	30	36	13	28	34	71	23	45
46	54	25	21	45	89	26	38	51	28	34	11	27	32	69	21	46
47	52	23	19	43	86	25	36	48	27	32	08	25	30	67	20	47
48	51	20	18	41	84	23	35	46	25	30	06	23	29	64	18	48
49	49	18	16	40	82	21	33	44	23	29	04	22	27	62	16	49
50	7247	1316	1015	7138	1180	0920	7031	1041	0822	6927	0901	0720	6825	0760	0614	50
51	45	14	13	36	77	18	29	39	20	25	0899	18	24	57	12	51
52	43	11	11	34	75	17	28	37	18	24	97	16	22	55	11	52
53	41	09	10	32	73	15	26	34	17	22	94	15	20	52	09	53
54	40	07	08	31	70	13	24	32	15	20	92	13	19	50	07	54
55	38	04	07	29	68	12	22	30	13	18	90	11	17	48	05	55
56	36	02	05	27	66	10	21	27	12	17	87	09	15	45	03	56
57	34	00	04	25	63	09	19	25	10	15	85	08	13	43	02	57
58	32	1298	02	23	61	07	17	23	08	13	83	06	12	41	00	58
59	30	95	01	22	59	05	15	20	07	12	80	04	10	38	0598	59

Altura — Somma ou differença — Logarithmos de latitude e declinação

T. X)

′	55°			56°			57°			58°			59°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	6808	0736	0596	6710	0592	0486	6613	0446	0371	6520	0299	0252	6428	0150	0129	0
1	07	33	94	08	90	84	12	44	69	18	97	50	27	48	27	1
2	05	31	93	06	87	82	10	42	67	16	94	48	25	45	24	2
3	03	29	91	05	85	80	09	39	66	15	92	46	24	43	22	3
4	02	26	89	03	82	78	07	37	64	13	89	44	22	40	20	4
5	00	24	87	02	80	77	05	34	62	12	87	42	21	38	18	5
6	6798	21	85	00	77	75	04	32	60	10	84	40	19	35	16	6
7	97	19	84	6698	75	73	02	29	58	09	82	38	18	33	14	7
8	95	17	82	97	73	71	01	27	56	07	79	36	16	30	12	8
9	93	14	80	95	70	69	6599	24	54	06	77	34	15	28	10	9
10	6792	0712	0578	6693	0568	0467	6597	0422	0352	6504	0274	0232	6413	0125	0108	10
11	90	10	76	92	65	65	96	20	50	03	72	30	12	23	05	11
12	89	07	74	90	63	63	94	17	48	01	70	28	10	20	03	12
13	87	05	73	89	61	61	93	15	46	00	67	26	09	18	01	13
14	85	02	71	87	58	60	91	12	44	6498	65	24	07	15	0099	14
15	84	00	69	85	56	58	90	10	42	96	62	22	06	13	97	15
16	82	0698	67	84	53	56	88	07	40	95	60	20	04	10	95	16
17	80	95	65	82	51	54	86	05	38	93	57	18	03	08	93	17
18	79	93	64	80	48	52	85	02	36	92	55	16	01	05	91	18
19	77	90	62	79	46	50	83	00	34	90	52	14	00	03	88	19
20	6775	0688	0560	6677	0544	0448	6582	0398	0332	6489	0250	0212	6399	0100	0086	20
21	74	86	58	76	41	46	80	95	30	87	47	10	97	0098	84	21
22	72	83	56	74	39	44	79	93	28	86	45	08	96	95	82	22
23	70	81	54	72	36	42	77	90	26	84	42	06	94	93	80	23
24	69	78	53	71	34	41	75	88	24	83	40	03	93	90	78	24
25	67	76	51	69	31	39	74	85	22	81	37	01	91	88	76	25
26	65	74	49	68	29	37	72	83	20	80	35	0199	90	85	74	26
27	64	71	47	66	27	35	71	80	18	78	32	97	88	83	71	27
28	62	69	45	64	24	33	69	78	16	77	30	95	87	80	69	28
29	60	66	43	63	22	31	68	75	14	75	27	93	85	78	67	29
30	6759	0664	0542	6661	0519	0429	6566	0373	0312	6474	0225	0191	6384	0075	0065	30
31	57	62	40	60	17	27	65	71	10	72	23	89	82	73	63	31
32	55	59	38	58	15	25	63	68	08	71	20	87	81	70	61	32
33	54	57	36	56	12	23	61	66	07	69	18	85	79	68	59	33
34	52	54	34	55	10	22	60	63	05	68	15	83	78	65	56	34
35	51	52	32	53	07	20	58	61	03	66	13	81	76	63	54	35
36	49	50	31	52	05	18	57	58	01	64	10	79	75	60	52	36
37	47	47	29	50	02	16	55	56	0299	63	08	77	73	58	50	37
38	46	45	27	48	00	14	54	53	97	61	05	75	72	55	48	38
39	44	42	25	47	0498	12	52	51	95	60	03	73	70	53	46	39
40	6742	0640	0523	6645	0495	0410	6550	0348	0293	6458	0200	0170	6369	0050	0043	40
41	41	38	21	44	93	08	49	46	91	57	0198	68	68	48	41	41
42	39	35	19	42	90	06	47	44	89	55	95	66	66	45	39	42
43	37	33	18	40	88	04	46	41	87	54	93	64	65	43	37	43
44	36	30	16	39	85	02	44	39	85	52	90	62	63	40	35	44
45	34	28	14	37	83	00	43	36	83	51	88	60	62	38	33	45
46	32	26	12	36	80	0398	41	34	81	49	85	58	60	35	30	46
47	31	23	10	34	78	97	40	31	79	48	83	56	59	33	28	47
48	29	21	08	32	76	95	38	29	77	46	80	54	57	30	26	48
49	28	18	06	31	73	93	37	26	75	45	78	52	56	28	24	49
50	6726	0616	0505	6629	0471	0391	6535	0324	0273	6443	0175	0150	6354	0025	0022	50
51	24	14	03	28	68	89	33	21	71	42	73	48	53	23	20	51
52	23	11	01	26	66	87	32	19	69	40	70	45	51	20	17	52
53	21	09	0499	24	63	85	30	16	67	39	68	43	50	18	15	53
54	19	06	97	23	61	83	29	14	64	37	65	41	48	15	13	54
55	18	04	95	21	59	81	27	12	62	36	63	39	47	13	11	55
56	16	02	93	20	56	79	26	09	60	34	60	37	46	10	09	56
57	15	0599	92	18	54	77	24	07	58	33	58	35	44	08	07	57
58	13	97	90	16	51	75	23	04	56	31	55	33	43	05	04	58
59	11	94	88	15	49	73	21	02	54	30	53	31	41	03	02	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	60°			61°			62°			63°			64°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	6340	0000	0000	6254	9848	9.9866	6171	9695	9.9726	6090	9540	9.9581	6012	9384	9.9429	0
1	38	9997	9.9998	52	46	64	69	92	24	89	37	78	11	81	26	1
2	37	95	96	51	43	61	68	90	21	87	35	76	10	78	24	2
3	35	92	93	50	40	59	66	87	19	86	32	73	08	76	21	3
4	34	90	91	48	38	57	65	84	17	85	30	71	07	73	18	4
5	32	87	89	47	35	55	64	82	14	83	27	69	06	71	16	5
6	31	85	87	45	33	52	62	79	12	82	24	66	04	68	13	6
7	30	82	85	44	30	50	61	77	10	81	22	63	03	65	11	7
8	28	80	82	43	28	48	60	74	07	79	19	61	02	63	08	8
9	27	77	80	41	25	45	58	72	05	78	17	59	01	60	05	9
10	6325	9975	9.9978	6240	9823	9.9843	6157	9669	9.9703	6077	9514	9.9556	5999	9358	9.9403	10
11	24	72	76	38	20	41	56	66	00	75	11	53	98	55	00	11
12	22	70	74	37	18	39	54	64	9.9698	74	09	51	97	52	9.9397	12
13	21	67	71	36	15	36	53	61	95	73	06	49	96	50	95	13
14	19	65	69	34	12	34	51	59	93	72	04	46	94	47	92	14
15	18	62	67	33	10	32	50	56	91	70	01	43	93	44	90	15
16	17	60	65	31	07	29	49	54	88	69	9498	41	92	42	87	16
17	15	57	63	30	05	27	47	51	86	68	96	38	90	39	84	17
18	14	55	60	29	02	25	46	48	83	66	93	36	89	37	82	18
19	12	52	58	27	00	22	45	46	81	65	91	33	88	34	79	19
20	6311	9950	9.9956	6226	9797	9.9820	6143	9643	9.9679	6064	9488	9.9531	5987	9331	9.9377	20
21	09	47	54	24	95	18	42	41	76	62	85	28	85	29	74	21
22	08	44	51	23	92	15	41	38	74	61	83	26	84	26	71	22
23	06	42	49	22	89	13	39	36	71	60	80	23	83	23	69	23
24	05	39	47	20	87	11	38	33	69	58	78	21	82	21	66	24
25	04	37	45	19	84	09	37	30	66	57	75	18	80	18	63	25
26	02	34	43	17	82	06	35	28	64	56	72	16	79	16	61	26
27	01	32	40	16	79	04	34	25	62	55	70	13	78	13	58	27
28	6299	29	38	15	77	02	33	23	59	53	67	11	77	10	55	28
29	98	27	36	13	74	9.9799	31	20	57	52	65	08	75	08	53	29
30	6296	9924	9.9934	6212	9772	9.9797	6130	9617	9.9654	6051	9462	9.9506	5974	9305	9.9350	30
31	95	22	31	10	69	95	29	15	52	49	59	03	73	02	47	31
32	94	19	29	09	66	92	27	12	49	48	57	00	72	00	45	32
33	92	17	27	08	64	90	26	10	47	47	54	9.9498	70	9297	42	33
34	91	14	25	06	61	88	25	07	45	45	52	95	69	95	40	34
35	89	12	22	05	59	85	23	05	42	44	49	93	68	92	37	35
36	88	09	20	04	56	83	22	02	40	43	46	90	67	89	34	36
37	86	06	18	02	54	81	21	9599	37	42	44	88	65	87	32	37
38	85	04	16	01	51	78	19	97	35	40	41	85	64	84	29	38
39	84	01	14	6199	49	76	18	94	32	39	39	83	63	81	26	39
40	6282	9899	9.9911	6198	9746	9.9774	6117	9592	9.9630	6038	9436	9.9480	5962	9279	9.9324	40
41	81	96	09	97	43	71	15	89	28	36	33	78	60	76	21	41
42	79	94	07	95	41	69	14	86	25	35	31	75	59	74	18	42
43	78	91	05	94	38	67	12	84	23	34	28	72	58	71	16	43
44	76	89	02	92	36	64	11	81	20	33	25	70	57	68	13	44
45	75	86	00	91	33	62	10	79	18	31	23	67	55	66	10	45
46	74	84	9.9898	90	31	59	09	76	15	30	20	65	54	63	08	46
47	72	81	96	88	28	57	07	74	13	29	18	62	53	60	05	47
48	71	79	93	87	26	55	06	71	10	27	15	60	52	58	02	48
49	69	76	91	86	23	52	05	68	08	26	12	57	50	55	9.9299	49
50	6268	9874	9.9889	6184	9720	9.9750	6103	9566	9.9605	6025	9410	9.9455	5949	9253	9.9297	50
51	67	71	86	83	18	48	02	63	03	24	07	52	48	50	94	51
52	65	68	84	81	15	45	01	61	01	22	05	49	47	47	91	52
53	64	66	82	80	13	43	6099	58	9.9598	21	02	47	46	45	89	53
54	62	63	80	79	10	41	98	55	96	20	9399	44	44	42	86	54
55	61	61	77	77	08	38	97	53	93	18	97	42	43	39	83	55
56	59	58	75	76	05	36	95	50	91	17	94	39	42	37	81	56
57	58	56	73	75	02	33	94	48	88	16	92	36	41	34	78	57
58	57	53	71	73	00	31	93	45	86	15	89	34	39	31	75	58
59	55	51	68	72	9697	29	91	42	83	13	86	31	38	29	72	59

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Altura – Somma ou differença – Logarithmos de latitude e declinação

T. X)

′	65°			66°			67°			68°			69°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	5937	9226	9.9270	5865	9067	9.9103	5795	8907	9.8929	5728	8746	9.8746	5664	8584	9.8554	0
1	36	24	67	63	65	01	94	05	26	27	43	43	63	81	50	1
2	34	21	64	62	62	9.9098	93	02	23	26	41	40	62	78	47	2
3	33	18	62	61	59	95	92	8899	20	25	38	37	61	76	44	3
4	32	16	59	60	57	92	90	97	17	24	35	34	60	73	40	4
5	31	13	56	59	54	89	89	94	14	23	33	30	59	70	37	5
6	30	10	53	57	51	86	88	91	11	22	30	27	58	67	34	6
7	28	08	51	56	49	84	87	89	08	21	27	24	57	65	30	7
8	27	05	48	55	46	81	86	86	05	19	24	21	56	62	27	8
9	26	02	45	54	43	78	85	83	02	18	22	18	55	59	24	9
10	5925	9200	9.9243	5853	9041	9.9075	5784	8881	9.8899	5717	8719	9.8715	5654	8557	9.8521	10
11	23	9197	40	52	38	72	83	78	96	16	16	11	53	54	17	11
12	22	95	37	50	35	69	81	75	93	15	14	08	52	51	14	12
13	21	92	34	49	33	66	80	72	90	14	11	05	51	48	11	13
14	20	89	32	48	30	63	79	70	87	13	08	02	50	46	07	14
15	19	87	29	47	27	61	78	67	84	12	06	9.8699	49	43	04	15
16	17	84	26	46	25	58	77	64	81	11	03	96	48	40	01	16
17	16	81	23	45	22	55	76	62	78	10	00	93	47	37	9.8497	17
18	15	79	21	43	19	52	75	59	75	09	8697	89	46	35	94	18
19	14	76	18	42	17	49	74	56	72	08	95	86	45	32	91	19
20	5912	9173	9.9215	5841	9014	9.9046	5772	8854	9.8869	5707	8692	9.8683	5644	8529	9.8487	20
21	11	71	12	40	11	43	71	51	66	05	89	80	42	27	84	21
22	10	68	10	39	09	40	70	48	63	04	87	77	41	24	80	22
23	09	65	07	38	06	38	69	46	60	03	84	73	40	21	77	23
24	08	63	04	36	03	35	68	43	57	02	81	70	39	18	74	24
25	06	60	01	35	01	32	67	40	54	01	79	67	38	16	70	25
26	05	58	9.9199	34	8998	29	66	38	51	00	76	64	37	13	67	26
27	04	55	96	33	95	26	65	35	48	5699	73	61	36	10	64	27
28	03	52	93	32	93	23	63	32	45	98	70	57	35	08	60	28
29	02	50	90	31	90	20	62	30	42	97	68	54	34	05	57	29
30	5900	9147	9.9188	5829	8987	9.9017	5761	8827	9.8839	5696	8665	9.8651	5633	8502	9.8454	30
31	5899	44	85	28	85	14	60	24	36	95	62	48	32	8499	50	31
32	98	42	82	27	82	11	59	21	33	94	60	45	31	97	47	32
33	97	39	79	26	79	09	58	19	30	93	57	41	30	94	43	33
34	96	36	76	25	77	06	57	16	26	92	54	38	29	91	40	34
35	94	34	74	24	74	03	56	13	23	91	51	35	28	88	37	35
36	93	31	71	22	71	00	55	11	20	89	49	32	27	86	33	36
37	92	28	68	21	69	9.8997	53	08	17	88	46	29	26	83	30	37
38	91	26	65	20	66	94	52	05	14	87	43	25	25	80	26	38
39	90	23	63	19	63	91	51	03	11	86	41	22	24	78	23	39
40	5888	9120	9.9160	5818	8961	9.8988	5750	8800	9.8808	5685	8638	9.8619	5623	8475	9.8420	40
41	87	18	57	17	58	85	49	8797	05	84	35	16	22	72	16	41
42	86	15	54	16	55	82	48	95	02	83	33	12	21	69	13	42
43	85	12	51	14	53	79	47	92	9.8799	82	30	09	20	67	09	43
44	84	10	49	13	50	76	46	89	96	81	27	06	19	64	06	44
45	82	07	46	12	47	73	45	86	93	80	24	03	18	61	03	45
46	81	05	43	11	45	71	43	84	90	79	22	9.8599	17	58	9.8399	46
47	80	02	40	10	42	68	42	81	86	78	19	96	16	56	96	47
48	79	9099	37	09	39	65	41	78	83	77	16	93	15	53	92	48
49	78	97	35	08	37	62	40	76	80	76	14	90	14	50	89	49
50	5876	9094	9.9132	5806	8934	9.8959	5739	8773	9.8777	5675	8611	9.8586	5613	8448	9.8385	50
51	75	91	29	05	31	56	38	70	74	74	08	83	12	45	82	51
52	74	89	26	04	29	53	37	68	71	73	05	80	11	42	78	52
53	73	86	23	03	26	50	36	65	68	72	03	77	10	39	75	53
54	72	83	20	02	23	47	35	62	65	70	00	73	09	37	72	54
55	70	81	18	01	21	44	34	60	62	69	8597	70	08	34	68	55
56	69	78	15	00	18	41	33	57	59	68	95	67	07	31	65	56
57	68	75	12	5798	15	38	31	54	55	67	92	63	06	28	61	57
58	67	73	09	97	13	35	30	51	52	66	89	60	05	26	58	58
59	66	70	06	96	10	32	29	49	49	65	86	57	04	23	54	59

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Altura — Somma ou differença — Logarithmos de latitude e declinação

T. X)

′	70°			71°			72°			73°			74°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	5603	8420	9.8351	5545	8256	9.8137	5489	8090	9.7910	5437	7924	9.7670	5387	7756	9.7414	0
1	02	17	47	44	53	33	80	87	06	36	21	66	87	54	09	1
2	01	15	44	43	50	29	88	85	02	35	18	61	86	51	05	2
3	00	12	40	42	47	26	87	82	9.7898	34	15	57	85	48	00	3
4	5599	09	37	41	45	22	86	79	95	34	13	53	84	45	9.7396	4
5	98	07	33	40	42	18	85	76	91	33	10	49	83	42	92	5
6	97	04	30	39	39	15	84	74	87	32	07	45	83	40	87	6
7	96	01	26	38	36	11	83	71	83	31	04	41	82	37	83	7
8	95	8398	23	37	34	07	82	68	79	30	01	36	81	34	78	8
9	94	96	19	36	31	04	81	65	75	29	7899	32	80	31	74	9
10	5593	8393	9.8316	5535	8228	9.8100	5480	8062	9.7871	5428	7896	9.7628	5379	7728	9.7369	10
11	92	90	12	34	25	96	80	60	67	28	93	24	79	26	65	11
12	91	87	09	34	23	92	79	57	63	27	90	20	78	23	60	12
13	90	85	05	33	20	89	78	54	59	26	88	16	77	20	56	13
14	89	82	02	32	17	85	77	51	55	25	85	11	76	17	52	14
15	88	79	9.8299	31	14	81	76	49	51	24	82	07	75	14	47	15
16	87	76	95	30	12	78	75	46	47	23	79	03	75	12	43	16
17	86	74	91	29	09	74	74	43	43	23	76	9.7599	74	09	38	17
18	85	71	88	28	06	70	73	40	40	22	74	95	73	06	34	18
19	84	68	84	27	03	66	73	38	36	21	71	90	72	03	29	19
20	5583	8365	9.8281	5526	8201	9.8063	5472	8035	9.7832	5420	7868	9.7586	5372	7700	9.7325	20
21	82	63	77	25	8198	59	71	32	28	19	65	82	71	7698	20	21
22	81	60	74	24	95	55	70	29	24	18	62	78	70	95	16	22
23	80	57	70	23	92	51	69	26	20	18	60	73	69	92	11	23
24	79	55	67	22	90	48	68	24	16	17	57	69	68	89	07	24
25	78	52	63	21	87	44	67	21	12	16	54	65	68	86	02	25
26	77	49	59	20	84	40	66	18	08	15	51	61	67	84	9.7297	26
27	77	46	56	20	81	36	65	15	04	14	49	56	66	81	93	27
28	76	44	52	19	79	33	65	13	00	13	46	52	65	78	89	28
29	75	41	49	18	76	29	64	10	9.7796	13	43	48	64	75	84	29
30	5574	8338	9.8245	5517	8173	9.8025	5463	8007	9.7792	5412	7840	9.7544	5364	7672	9.7279	30
31	73	35	42	16	70	21	62	04	88	11	37	39	63	70	75	31
32	72	33	38	15	68	18	61	02	84	10	35	35	62	67	70	32
33	71	30	35	14	65	14	60	7999	80	09	32	31	61	64	66	33
34	70	27	31	13	62	10	59	96	76	09	29	27	61	61	61	34
35	69	24	27	12	59	06	58	93	72	08	26	22	60	58	56	35
36	68	22	24	11	56	02	58	90	68	07	23	18	59	56	52	36
37	67	19	20	10	54	9.7998	57	88	64	06	21	14	58	53	47	37
38	66	16	17	09	51	95	56	85	60	05	18	09	58	50	43	38
39	65	13	13	08	48	91	55	82	55	04	15	05	57	47	38	39
40	5564	8311	9.8209	5508	8145	9.7987	5454	7979	9.7751	5404	7812	9.7501	5356	7644	9.7233	40
41	63	08	06	07	43	83	53	77	47	03	09	9.7497	55	42	29	41
42	62	05	02	06	40	79	52	74	43	02	07	92	54	39	25	42
43	61	02	9.8199	05	37	76	52	71	39	01	04	88	54	36	20	43
44	60	00	95	04	34	72	51	68	35	00	01	84	53	33	15	44
45	59	8297	91	03	32	68	50	65	31	00	7798	79	52	30	10	45
46	58	94	88	02	29	64	49	63	27	5399	95	75	51	28	06	46
47	57	91	84	01	26	60	48	60	23	98	93	71	51	25	01	47
48	56	89	80	00	23	57	47	57	19	97	90	66	50	22	9.7196	48
49	55	86	77	5499	21	53	46	54	15	96	87	62	49	19	92	49
50	5554	8283	9.8173	5498	8118	9.7949	5446	7952	9.7711	5395	7784	9.7457	5348	7616	9.7187	50
51	53	80	70	98	15	45	45	49	07	95	82	53	48	13	82	51
52	52	78	66	97	12	41	44	46	03	94	79	49	47	11	78	52
53	51	75	62	96	10	37	43	43	9.7698	93	76	44	46	08	73	53
54	51	72	59	95	07	33	42	40	94	92	73	40	45	05	68	54
55	50	69	55	94	04	30	41	38	90	91	70	36	45	02	64	55
56	49	67	51	93	01	26	40	35	86	91	68	31	44	7599	59	56
57	48	64	48	92	8098	22	40	32	82	90	65	27	43	97	54	57
58	47	61	44	91	96	18	39	29	78	89	62	22	42	94	50	58
59	46	58	40	90	93	14	38	26	74	88	59	18	41	91	45	59

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Altura — Somma ou differença — Logarithmos de latitude e declinação

T. X)

′	75°			76°			77°			78°			79°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	5341	7588	9.7140	5297	7419	9.6847	5256	7250	9.6531	5219	7079	9.6189	5184	6908	9.5816	0
1	40	85	36	96	16	42	56	47	26	18	76	83	83	05	10	1
2	39	83	31	96	14	37	55	44	20	17	73	77	83	02	03	2
3	38	80	26	95	11	32	54	41	15	17	71	71	82	00	9.5797	3
4	38	77	21	94	08	27	54	38	09	16	68	65	82	6897	90	4
5	37	74	17	94	05	22	53	35	04	16	65	59	81	94	84	5
6	36	71	12	93	02	17	52	32	9.6498	15	62	53	80	91	77	6
7	35	69	07	92	7399	11	52	30	93	14	59	47	80	88	71	7
8	35	66	02	91	97	06	51	27	87	14	56	41	79	85	64	8
9	34	63	9.7098	91	94	01	50	24	82	13	53	35	79	82	57	9
10	5333	7560	9.7093	5290	7391	9.6796	5250	7221	9.6476	5213	7051	9.6129	5178	6880	9.5751	10
11	33	57	88	89	88	91	49	18	71	12	48	23	78	77	44	11
12	32	54	83	89	85	86	49	15	65	11	45	17	77	74	38	12
13	31	52	78	88	83	81	48	13	59	11	42	11	77	71	31	13
14	30	49	74	87	80	75	47	10	54	10	39	05	76	68	24	14
15	30	46	69	87	77	70	47	07	48	10	36	9.6099	76	65	18	15
16	29	43	64	86	74	65	46	04	43	09	34	93	75	62	11	16
17	28	40	59	85	71	60	45	01	37	08	31	87	74	60	04	17
18	27	38	54	85	68	55	45	7198	31	08	28	81	74	57	9.5698	18
19	27	35	50	84	66	50	44	96	26	07	25	75	73	54	91	19
20	5326	7532	9.7045	5283	7363	9.6745	5243	7193	9.6420	5207	7022	9.6068	5173	6851	9.5684	20
21	25	29	40	82	60	39	43	90	15	06	19	62	72	48	78	21
22	24	26	35	82	57	34	42	87	09	05	16	56	72	45	71	22
23	24	24	30	81	54	29	41	84	06	05	14	50	71	42	64	23
24	23	21	25	80	51	24	41	81	9.6398	04	11	44	71	40	57	24
25	22	18	21	80	49	18	40	79	92	04	08	38	70	37	51	25
26	21	15	16	79	46	13	40	76	86	03	05	32	70	34	44	26
27	21	12	11	78	43	08	39	73	81	03	02	25	69	31	37	27
28	20	09	06	78	40	03	38	70	75	02	6999	19	69	28	30	28
29	19	07	01	77	37	9.6697	38	67	69	01	97	13	68	25	23	29
30	5319	7504	9.6996	5276	7334	9.6692	5237	7164	9.6364	5201	6994	9.6007	5167	6822	9.5617	30
31	18	01	91	76	32	87	36	62	58	00	91	01	67	19	10	31
32	17	7498	87	75	29	82	36	59	52	00	88	9.5995	66	17	03	32
33	16	95	82	74	26	77	35	56	47	5199	85	88	66	14	9.5596	33
34	16	93	77	74	23	71	35	53	41	98	82	82	65	11	89	34
35	15	90	72	73	20	66	34	50	35	98	79	76	65	08	82	35
36	14	87	67	72	17	60	33	47	29	97	77	69	64	05	76	36
37	13	84	62	72	15	55	33	45	24	97	74	63	64	02	69	37
38	13	81	57	71	12	50	32	42	18	96	71	57	63	6799	62	38
39	12	78	52	70	09	45	31	39	12	96	68	51	63	97	55	39
40	5311	7476	9.6947	5270	7306	9.6639	5231	7136	9.6306	5195	6965	9.5944	5162	6794	9.5548	40
41	11	73	42	69	03	34	30	33	01	94	62	38	62	91	41	41
42	10	70	37	69	00	29	30	30	9.6295	94	59	32	61	88	34	42
43	09	67	32	68	7298	23	29	27	89	93	57	25	61	85	27	43
44	08	64	27	67	95	18	28	25	83	93	54	19	60	82	20	44
45	08	62	22	66	92	12	28	22	77	92	51	13	60	79	13	45
46	07	59	17	66	89	07	27	19	71	92	48	06	59	77	06	46
47	06	56	12	65	86	02	26	16	66	91	45	00	59	74	9.5499	47
48	06	53	07	64	84	9.6596	26	13	60	90	42	9.5894	58	71	92	48
49	05	50	02	64	81	91	25	10	54	90	39	87	58	68	85	49
50	5304	7447	9.6897	5263	7278	9.6586	5225	7108	9.6248	5189	6937	9.5881	5157	6765	9.5478	50
51	03	45	92	62	75	80	24	05	42	89	34	75	57	62	71	51
52	03	42	87	62	72	75	23	02	36	88	31	68	56	59	64	52
53	02	39	82	61	69	69	23	7099	30	88	28	62	55	57	57	53
54	01	36	77	60	67	64	22	96	25	87	25	55	55	54	50	54
55	01	33	72	60	64	58	22	93	19	87	22	49	54	51	43	55
56	00	31	67	59	61	53	21	90	13	86	20	42	54	48	36	56
57	5299	28	62	58	58	48	20	88	07	85	17	36	53	45	28	57
58	98	25	57	58	55	42	20	85	01	85	14	29	53	42	21	58
59	98	22	52	57	52	37	19	82	9.6195	84	11	23	52	39	14	59

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Altura — Somma ou differença — Logarithmos de latitude e declinação

T. X)

′	80°			81°			82°			83°			84°			′
	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	A	D	Lt. Dc.	
0	5152	6736	9.5407	5123	6564	9.4954	5097	6392	9.4446	5075	6219	9.3869	5055	6045	9.3203	0
1	51	34	00	23	61	46	97	89	37	74	16	59	54	42	9.3191	1
2	51	31	9.5393	22	59	38	97	86	28	74	13	49	54	39	79	2
3	50	28	85	22	56	30	96	83	19	73	10	38	54	37	66	3
4	50	25	78	21	53	22	96	80	10	73	07	28	54	34	54	4
5	49	22	71	21	50	14	95	77	01	73	04	17	53	31	42	5
6	49	19	64	20	47	05	95	74	9.4392	72	01	07	53	28	30	6
7	48	16	57	20	44	9.4897	95	72	82	72	6198	9.3797	53	25	18	7
8	48	14	49	19	41	89	94	69	73	72	96	86	52	22	05	8
9	47	11	42	19	38	81	94	66	64	71	93	76	52	19	9.3093	9
10	5147	6708	9.5335	5119	6536	9.4873	5093	6363	9.4355	5071	6190	9.3765	5052	6016	9.3081	10
11	46	05	27	18	33	65	93	60	46	71	87	55	51	13	68	11
12	46	02	20	18	30	57	93	57	37	70	84	44	51	11	56	12
13	45	6699	13	17	27	49	92	54	27	70	81	33	51	08	43	13
14	45	96	05	17	24	40	92	51	18	70	78	23	51	05	31	14
15	44	93	9.5298	16	21	32	91	49	09	69	75	12	50	02	18	15
16	44	91	91	16	18	24	91	46	00	69	72	01	50	5999	06	16
17	43	88	83	15	15	16	91	43	9.4290	69	70	9.3691	50	96	9.2993	17
18	43	85	76	15	13	08	90	40	81	68	67	80	49	93	81	18
19	42	82	69	15	10	9.4799	90	37	72	68	64	69	49	90	68	19
20	5142	6679	9.5261	5114	6507	9.4791	5089	6334	9.4262	5068	6161	9.3658	5049	5987	9.2955	20
21	41	76	54	14	04	83	89	31	53	67	58	48	49	85	43	21
22	41	73	46	13	01	74	89	28	43	67	55	37	48	82	30	22
23	41	71	39	13	6498	66	88	25	34	67	52	26	48	79	17	23
24	40	68	31	12	95	58	88	23	24	66	49	15	48	76	04	24
25	40	65	24	12	92	49	87	20	15	66	46	04	47	73	9.2891	25
26	39	62	16	12	90	41	87	17	05	66	44	9.3593	47	70	78	26
27	39	59	09	11	87	33	87	14	9.4196	65	41	82	47	67	65	27
28	38	56	01	11	84	24	86	11	86	65	38	71	47	64	52	28
29	38	53	9.5194	10	81	16	86	08	77	65	35	60	46	61	39	29
30	5137	6650	9.5186	5110	6478	9.4707	5086	6305	9.4167	5064	6132	9.3549	5046	5958	9.2826	30
31	37	48	79	09	75	9.4699	85	02	58	64	29	38	46	56	13	31
32	36	45	71	09	72	90	85	6299	48	64	26	27	45	53	00	32
33	36	42	64	09	69	82	84	97	38	63	23	15	45	50	9.2786	33
34	35	39	56	08	67	73	84	94	29	63	20	04	45	47	73	34
35	35	36	48	08	64	65	84	91	19	63	18	9.3493	45	44	60	35
36	34	33	41	07	61	56	83	88	09	62	15	82	44	41	47	36
37	34	30	33	07	58	48	83	85	00	62	12	71	44	38	33	37
38	33	28	26	06	55	39	83	82	9.4090	62	09	59	44	35	20	38
39	33	25	18	06	52	31	82	79	80	61	06	48	44	32	06	39
40	5132	6622	9.5110	5106	6449	9.4622	5082	6276	9.4070	5061	6103	9.3437	5043	5929	9.2693	40
41	32	19	03	05	46	13	81	74	60	61	00	25	43	27	79	41
42	31	16	9.5095	05	44	05	81	71	51	60	6097	14	43	24	66	42
43	31	13	87	04	41	9.4596	81	68	41	60	94	02	42	21	52	43
44	30	10	79	04	38	87	80	65	31	60	92	9.3391	42	18	38	44
45	30	07	72	03	35	79	80	62	21	59	89	79	42	15	25	45
46	30	05	64	03	32	70	80	59	11	59	86	68	42	12	11	46
47	29	02	56	03	29	61	79	56	01	59	83	56	41	09	9.2597	47
48	29	6599	48	02	26	52	79	53	9.3991	58	80	45	41	06	83	48
49	28	96	40	02	23	44	78	50	81	58	77	33	41	03	69	49
50	5128	6593	9.5033	5101	6421	9.4535	5078	6248	9.3971	5058	6074	9.3321	5041	5901	9.2555	50
51	27	90	25	01	18	26	78	45	61	58	71	09	40	5898	41	51
52	27	87	17	01	15	17	77	42	51	57	68	9.3298	40	95	27	52
53	26	84	09	00	12	08	77	39	41	57	66	86	40	92	13	53
54	26	82	01	00	09	9.4499	77	36	31	57	63	74	40	89	9.2499	54
55	25	79	9.4993	5099	06	91	76	33	20	56	60	62	39	86	85	55
56	25	76	85	99	03	82	76	30	10	56	57	50	39	83	71	56
57	24	73	77	99	00	73	76	27	00	56	54	39	39	80	56	57
58	24	70	70	98	6397	64	75	24	9.3890	55	51	27	39	77	42	58
59	24	67	62	98	95	55	75	22	80	55	48	15	38	74	28	59

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Altura — Somma ou differença — Logarithmos de latitude e declinação

T. X)

′	85° A	85° D	85° Lt. Dc.	86° A	86° D	86° Lt. Dc.	87° A	87° D	87° Lt. Dc.	88° A	88° D	88° Lt. Dc.	89° A	89° D	89° Lt. Dc.	′
0	5038	5872	9.2413	5024	5698	9.1446	5014	5523	9.0198	5006	5349	8.8438	5002	5175	8.5429	0
1	38	69	9.2399	24	95	28	14	20	74	06	46	02	01	72	8.5356	1
2	38	66	84	24	92	10	13	18	50	06	43	8.8366	01	69	8.5282	2
3	37	63	70	24	89	9.1392	13	15	25	06	40	29	01	66	8.5206	3
4	37	60	55	24	86	73	13	12	01	06	37	8.8291	01	63	8.5129	4
5	37	57	40	23	83	55	13	09	9.0076	06	34	54	01	60	8.5051	5
6	37	54	26	23	80	36	13	06	51	06	32	16	01	57	8.4971	6
7	36	51	11	23	77	18	13	03	26	05	29	8.8178	01	54	8.4890	7
8	36	48	9.2296	23	74	9.1299	13	00	01	05	26	39	01	51	8.4807	8
9	36	45	81	23	71	80	12	5497	8.9976	05	23	00	01	48	8.4723	9
10	5036	5843	9.2266	5022	5669	91262	5012	5494	8.9950	5005	5320	8.8061	5001	5145	8.4637	10
11	35	40	51	22	66	43	12	91	25	05	17	21	01	43	8.4549	11
12	35	37	36	22	63	24	12	88	8.9899	05	14	8.7981	01	40	8.4460	12
13	35	34	21	22	60	05	12	86	73	05	11	41	01	37	8.4368	13
14	35	31	06	22	57	9.1186	12	83	47	05	08	00	01	34	8.4275	14
15	34	28	9.2191	21	54	66	12	80	21	05	05	8.7859	01	31	8.4180	15
16	34	25	76	21	51	47	11	77	8.9794	05	02	17	01	28	8.4082	16
17	34	22	61	21	48	28	11	74	68	04	00	8.7775	01	25	8 3982	17
18	34	19	45	21	45	08	11	71	41	04	5297	33	01	22	8.3880	18
19	33	16	30	21	42	9.1088	11	68	14	04	94	8.7690	01	19	8.3775	19
20	5033	5814	9.2114	5020	5640	9.1069	5011	5465	8.9687	5004	5291	8.7647	5001	5116	8.3668	20
21	33	11	9.2099	20	37	49	11	62	60	04	88	03	01	13	8.3558	21
22	33	08	83	20	34	29	11	59	33	04	85	8.7559	01	11	8.3445	22
23	32	05	68	20	31	09	10	57	05	04	82	15	01	08	8.3329	23
24	32	02	52	20	28	9 0989	10	54	8.9577	04	79	8.7470	01	05	8.3211	24
25	32	5799	36	20	25	69	10	51	49	04	76	24	01	02	8.3088	25
26	32	96	20	19	22	49	10	48	21	04	73	8.7378	00	5099	8.2962	26
27	32	93	05	19	19	29	10	45	8.9493	04	70	32	00	96	8.2833	27
28	31	90	9.1989	19	16	08	10	42	65	04	68	8.7285	00	93	8.2699	28
29	31	87	73	19	13	9.0888	10	39	36	04	65	37	00	90	8.2561	29
30	5031	5785	9.1957	5019	5610	9.0867	5010	5436	8.9407	5003	5262	8.7189	5000	5087	8.2419	30
31	31	82	41	18	08	46	09	33	8.9378	03	59	41	00	84	8.2271	31
32	30	79	25	18	05	26	09	30	49	03	56	8.7092	00	81	8.2119	32
33	30	76	08	18	02	05	09	27	19	03	53	42	00	79	8.1961	33
34	30	73	9.1892	18	5599	9.0784	09	25	8.9290	03	50	8.6992	00	76	8.1797	34
35	30	70	76	18	96	63	09	22	60	03	47	41	00	73	8.1627	35
36	29	67	59	18	93	41	09	19	30	03	44	8.6890	00	70	8.1450	36
37	29	64	43	17	90	20	09	16	00	03	41	38	00	67	8.1265	37
38	29	61	26	17	87	9.0699	09	13	8.9169	03	39	8.6785	00	64	8.1072	38
39	29	58	10	17	84	77	08	10	39	03	36	32	00	61	8.0870	39
40	5029	5756	9.1793	5017	5581	9.0655	5008	5407	8.9108	5003	5233	8.6678	5000	5058	8.0658	40
41	28	53	76	17	79	34	08	04	8.9077	03	30	23	00	55	8.0435	41
42	28	50	60	17	76	12	08	01	45	03	27	8.6568	00	52	8.0200	42
43	28	47	43	16	73	9.0590	08	5398	14	03	24	12	00	49	7.9952	43
44	28	44	26	16	70	68	08	96	8.8982	02	21	8.6455	00	47	7.9689	44
45	27	41	09	16	67	46	08	93	50	02	18	8.6398	00	44	7.9408	45
46	27	38	9.1692	16	64	23	08	90	18	02	15	40	00	41	7.9109	46
47	27	35	75	16	61	01	07	87	8.8885	02	12	8.6280	00	38	7.8787	47
48	27	32	58	16	58	9.0478	07	84	52	02	09	21	00	35	7.8439	48
49	27	29	40	15	55	56	07	81	19	02	07	8.6160	00	32	7.8061	49
50	5026	5727	9.1623	5015	5552	9.0433	5007	5378	8.8786	5002	5204	8.6008	5000	5029	7.7648	50
51	26	24	06	15	49	10	07	75	52	02	01	36	00	26	7.7190	51
52	26	21	9.1588	15	47	9.0387	07	72	19	02	5198	8.5972	00	23	7.6678	52
53	26	18	71	15	44	64	07	69	8.8685	02	95	08	00	20	7.6099	53
54	26	15	53	15	41	41	07	66	50	02	92	8.5843	00	17	7.5429	54
55	25	12	36	14	38	17	07	64	16	02	89	8.5776	00	15	7.4637	55
56	25	09	18	14	35	9.0294	07	61	8.8581	02	86	09	00	12	7.3668	56
57	25	06	00	14	32	70	06	58	46	02	83	8.5641	00	09	7.2419	57
58	25	03	9.1482	14	29	46	06	55	10	02	80	8.5571	00	06	7.0658	58
59	25	00	64	14	26	22	06	52	8.8475	02	77	01	00	03	6.7648	59

Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
100	0000	9996	9991	9987	9983	9978	9974	9970	9965	9961	100
101	9957	9952	9948	9944	9940	9935	9931	9927	9923	9918	101
102	9914	9910	9905	9901	9897	9893	9889	9884	9880	9876	102
103	9872	9867	9863	9859	9855	9851	9846	9842	9838	9834	103
104	9830	9825	9821	9817	9813	9809	9805	9801	9796	9792	104
105	9788	9784	9780	9776	9772	9767	9763	9759	9755	9751	105
106	9747	9743	9739	9735	9731	9726	9722	9718	9714	9710	106
107	9706	9702	9698	9694	9690	9686	9682	9678	9674	9670	107
108	9666	9662	9658	9654	9650	9646	9642	9638	9634	9630	108
109	9626	9622	9618	9614	9610	9606	9602	9598	9594	9590	109
110	9586	9582	9578	9574	9570	9566	9562	9559	9555	9551	110
111	9547	9543	9539	9535	9531	9527	9523	9519	9516	9512	111
112	9508	9504	9500	9496	9492	9488	9485	9481	9477	9473	112
113	9469	9465	9462	9458	9454	9450	9446	9442	9439	9435	113
114	9431	9427	9423	9420	9416	9412	9408	9404	9401	9397	114
115	9393	9389	9385	9382	9378	9374	9370	9367	9363	9359	115
116	9355	9352	9348	9344	9340	9337	9333	9329	9326	9322	116
117	9318	9314	9311	9307	9303	9300	9296	9292	9289	9285	117
118	9281	9277	9274	9270	9266	9263	9259	9255	9252	9248	118
119	9245	9241	9237	9234	9230	9226	9223	9219	9215	9212	119
120	9208	9205	9201	9197	9194	9190	9187	9183	9179	9176	120
121	9172	9169	9165	9161	9158	9154	9151	9147	9144	9140	121
122	9136	9133	9129	9126	9122	9119	9115	9112	9108	9104	122
123	9101	9097	9094	9090	9087	9083	9080	9076	9073	9069	123
124	9066	9062	9059	9055	9052	9048	9045	9041	9038	9034	124
125	9031	9027	9024	9020	9017	9014	9010	9007	9003	9000	125
126	8996	8993	8989	8986	8983	8979	8976	8972	8969	8965	126
127	8962	8959	8955	8952	8948	8945	8941	8938	8935	8931	127
128	8928	8925	8921	8918	8914	8911	8908	8904	8901	8897	128
129	8894	8891	8887	8884	8881	8877	8874	8871	8867	8864	129
130	8861	8857	8854	8851	8847	8844	8841	8837	8834	8831	130
131	8827	8824	8821	8817	8814	8811	8807	8804	8801	8798	131
132	8794	8791	8788	8784	8781	8778	8775	8771	8768	8765	132
133	8761	8758	8755	8752	8748	8745	8742	8739	8735	8732	133
134	8729	8726	8722	8719	8716	8713	8710	8706	8703	8700	134
135	8697	8693	8690	8687	8684	8681	8677	8674	8671	8668	135
136	8665	8661	8658	8655	8652	8649	8645	8642	8639	8636	136
137	8633	8630	8626	8623	8620	8617	8614	8611	8608	8604	137
138	8601	8598	8595	8592	8589	8585	8582	8579	8576	8573	138
139	8570	8567	8564	8560	8557	8554	8551	8548	8545	8542	139
140	8539	8536	8533	8529	8526	8523	8520	8517	8514	8511	140
141	8508	8505	8502	8499	8496	8492	8489	8486	8483	8480	141
142	8477	8474	8471	8468	8465	8462	8459	8456	8453	8450	142
143	8447	8444	8441	8438	8435	8431	8428	8425	8422	8419	143
144	8416	8413	8410	8407	8404	8401	8398	8395	8392	8389	144
145	8386	8383	8380	8377	8374	8371	8368	8365	8362	8359	145
146	8356	8353	8351	8348	8345	8342	8339	8336	8333	8330	146
147	8327	8324	8321	8318	8315	8312	8309	8306	8303	8300	147
148	8297	8294	8292	8289	8286	8283	8280	8277	8274	8271	148
149	8268	8265	8262	8259	8256	8254	8251	8248	8245	8242	149
150	8239	8236	8233	8230	8228	8225	8222	8219	8216	8213	150
151	8210	8207	8204	8202	8199	8196	8193	8190	8187	8184	151
152	8182	8179	8176	8173	8170	8167	8164	8162	8159	8156	152
153	8153	8150	8147	8145	8142	8139	8136	8133	8130	8128	153
154	8125	8122	8119	8116	8114	8111	8108	8105	8102	8099	154
155	8097	8094	8091	8088	8085	8083	8080	8077	8074	8072	155
156	8069	8066	8063	8060	8058	8055	8052	8049	8047	8044	156
157	8041	8038	8035	8033	8030	8027	8024	8022	8019	8016	157
158	8013	8011	8008	8005	8002	8000	7997	7994	7991	7989	158
159	7986	7983	7981	7978	7975	7972	7970	7967	7964	7962	159

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
160	7959	7956	7953	7951	7948	7945	7943	7940	7937	7934	160
161	7932	7929	7926	7924	7921	7918	7916	7913	7910	7908	161
162	7905	7902	7899	7897	7894	7891	7889	7886	7883	7881	162
163	7878	7875	7873	7870	7867	7865	7862	7860	7857	7854	163
164	7852	7849	7846	7844	7841	7838	7836	7833	7830	7828	164
165	7825	7823	7820	7817	7815	7812	7809	7807	7804	7802	165
166	7799	7796	7794	7791	7788	7786	7783	7781	7778	7775	166
167	7773	7770	7768	7765	7762	7760	7757	7755	7752	7749	167
168	7747	7744	7742	7739	7737	7734	7731	7729	7726	7724	168
169	7721	7719	7716	7713	7711	7708	7706	7703	7701	7698	169
170	7696	7693	7690	7688	7685	7683	7680	7678	7675	7673	170
171	7670	7667	7665	7662	7660	7657	7655	7652	7650	7647	171
172	7645	7642	7640	7637	7635	7632	7630	7627	7625	7622	172
173	7620	7617	7615	7612	7610	7607	7604	7602	7599	7597	173
174	7595	7592	7590	7587	7585	7582	7580	7577	7575	7572	174
175	7570	7567	7565	7562	7560	7557	7555	7552	7550	7547	175
176	7545	7542	7540	7537	7535	7533	7530	7528	7525	7523	176
177	7520	7518	7515	7513	7510	7508	7506	7503	7501	7498	177
178	7496	7493	7491	7488	7486	7484	7481	7479	7476	7474	178
179	7471	7469	7467	7464	7462	7459	7457	7455	7452	7450	179
180	7447	7445	7442	7440	7438	7435	7433	7430	7428	7426	180
181	7423	7421	7418	7416	7414	7411	7409	7406	7404	7402	181
182	7399	7397	7395	7392	7390	7387	7385	7383	7380	7378	182
183	7375	7373	7371	7368	7366	7364	7361	7359	7357	7354	183
184	7352	7349	7347	7345	7342	7340	7338	7335	7333	7331	184
185	7328	7326	7324	7321	7319	7317	7314	7312	7310	7307	185
186	7305	7303	7300	7298	7296	7293	7291	7289	7286	7284	186
187	7282	7279	7277	7275	7272	7270	7268	7265	7263	7261	187
188	7258	7256	7254	7251	7249	7247	7245	7242	7240	7238	188
189	7235	7233	7231	7228	7226	7224	7222	7219	7217	7215	189
190	7212	7210	7208	7206	7203	7201	7199	7196	7194	7192	190
191	7190	7187	7185	7183	7181	7178	7176	7174	7172	7169	191
192	7167	7165	7162	7160	7158	7156	7153	7151	7149	7147	192
193	7144	7142	7140	7138	7135	7133	7131	7129	7126	7124	193
194	7122	7120	7118	7115	7113	7111	7109	7106	7104	7102	194
195	7100	7097	7095	7093	7091	7089	7086	7084	7082	7080	195
196	7077	7075	7073	7071	7069	7066	7064	7062	7060	7058	196
197	7055	7053	7051	7049	7047	7044	7042	7040	7038	7036	197
198	7033	7031	7029	7027	7025	7022	7020	7018	7016	7014	198
199	7011	7009	7007	7005	7003	7001	6998	6996	6994	6992	199
200	6990	6988	6985	6983	6981	6979	6977	6975	6972	6970	200
201	6968	6966	6964	6962	6959	6957	6955	6953	6951	6949	201
202	6946	6944	6942	6940	6938	6936	6934	6931	6929	6927	202
203	6925	6923	6921	6919	6916	6914	6912	6910	6908	6906	203
204	6904	6902	6899	6897	6895	6893	6891	6889	6887	6885	204
205	6882	6880	6878	6876	6874	6872	6870	6868	6866	6863	205
206	6861	6859	6857	6855	6853	6851	6849	6847	6844	6842	206
207	6840	6838	6836	6834	6832	6830	6828	6826	6824	6821	207
208	6819	6817	6815	6813	6811	6809	6807	6805	6803	6801	208
209	6799	6796	6794	6792	6790	6788	6786	6784	6782	6780	209
210	6778	6776	6774	6772	6770	6767	6765	6763	6761	6759	210
211	6757	6755	6753	6751	6749	6747	6745	6743	6741	6739	211
212	6737	6735	6733	6730	6728	6726	6724	6722	6720	6718	212
213	6716	6714	6712	6710	6708	6706	6704	6702	6700	6698	213
214	6696	6694	6692	6690	6688	6686	6684	6682	6680	6678	214
215	6676	6674	6672	6670	6668	6666	6664	6661	6659	6657	215
216	6655	6653	6651	6649	6647	6645	6643	6641	6639	6637	216
217	6635	6633	6631	6629	6627	6625	6623	6621	6619	6617	217
218	6615	6613	6611	6609	6607	6605	6603	6602	6600	6598	218
219	6596	6594	6592	6590	6588	6586	6584	6582	6580	6578	219

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
220	6576	6574	6572	6570	6568	6566	6564	6562	6560	6558	220
221	6556	6554	6552	6550	6548	6546	6544	6542	6540	6538	221
222	6536	6535	6533	6531	6529	6527	6525	6523	6521	6519	222
223	6517	6515	6513	6511	6509	6507	6505	6503	6501	6499	223
224	6498	6496	6494	6492	6490	6488	6486	6484	6482	6480	224
225	6478	6476	6474	6472	6470	6469	6467	6465	6463	6461	225
226	6459	6457	6455	6453	6451	6449	6447	6445	6444	6442	226
227	6440	6438	6436	6434	6432	6430	6428	6426	6424	6423	227
228	6421	6419	6417	6415	6413	6411	6409	6407	6405	6404	228
229	6402	6400	6398	6396	6394	6392	6390	6388	6386	6385	229
230	6383	6381	6379	6377	6375	6373	6371	6370	6368	6366	230
231	6364	6362	6360	6358	6356	6354	6353	6351	6349	6347	231
232	6345	6343	6341	6340	6338	6336	6334	6332	6330	6328	232
233	6326	6325	6323	6321	6319	6317	6315	6313	6312	6310	233
234	6308	6306	6304	6302	6300	6299	6297	6295	6293	6291	234
235	6289	6287	6286	6284	6282	6280	6278	6276	6275	6273	235
236	6271	6269	6267	6265	6264	6262	6260	6258	6256	6254	236
237	6253	6251	6249	6247	6245	6243	6242	6240	6238	6236	237
238	6234	6232	6231	6229	6227	6225	6223	6221	6220	6218	238
239	6216	6214	6212	6211	6209	6207	6205	6203	6202	6200	239
240	6198	6196	6194	6192	6191	6189	6187	6185	6183	6182	240
241	6180	6178	6176	6174	6173	6171	6169	6167	6165	6164	241
242	6162	6160	6158	6156	6155	6153	6151	6149	6148	6146	242
243	6144	6142	6140	6139	6137	6135	6133	6131	6130	6128	243
244	6126	6124	6123	6121	6119	6117	6115	6114	6112	6110	244
245	6108	6107	6105	6103	6101	6099	6098	6096	6094	6092	245
246	6091	6089	6087	6085	6084	6082	6080	6078	6077	6075	246
247	6073	6071	6070	6068	6066	6064	6062	6061	6059	6057	247
248	6055	6054	6052	6050	6048	6047	6045	6043	6041	6040	248
249	6038	6036	6035	6033	6031	6029	6028	6026	6024	6022	249
250	6021	6019	6017	6015	6014	6012	6010	6008	6007	6005	250
251	6003	6002	6000	5998	5996	5995	5993	5991	5989	5988	251
252	5986	5984	5983	5981	5979	5977	5976	5974	5972	5971	252
253	5969	5967	5965	5964	5962	5960	5959	5957	5955	5953	253
254	5952	5950	5948	5947	5945	5943	5941	5940	5938	5936	254
255	5935	5933	5931	5929	5928	5926	5924	5923	5921	5919	255
256	5918	5916	5914	5913	5911	5909	5907	5906	5904	5902	256
257	5901	5899	5897	5896	5894	5892	5891	5889	5887	5885	257
258	5884	5882	5880	5879	5877	5875	5874	5872	5870	5869	258
259	5867	5865	5864	5862	5860	5859	5857	5855	5854	5852	259
260	5850	5849	5847	5845	5844	5842	5840	5839	5837	5835	260
261	5834	5832	5830	5829	5827	5825	5824	5822	5820	5819	261
262	5817	5815	5814	5812	5810	5809	5807	5805	5804	5802	262
263	5800	5799	5797	5795	5794	5792	5791	5789	5787	5786	263
264	5784	5782	5781	5779	5777	5776	5774	5772	5771	5769	264
265	5768	5766	5764	5763	5761	5759	5758	5756	5754	5753	265
266	5751	5750	5748	5746	5745	5743	5741	5740	5738	5737	266
267	5735	5733	5732	5730	5728	5727	5725	5724	5722	5720	267
268	5719	5717	5715	5714	5712	5711	5709	5707	5706	5704	268
269	5702	5701	5699	5698	5696	5694	5693	5691	5690	5688	269
270	5686	5685	5683	5682	5680	5678	5677	5675	5674	5672	270
271	5670	5669	5667	5665	5664	5662	5661	5659	5658	5656	271
272	5654	5653	5651	5650	5648	5646	5645	5643	5642	5640	272
273	5638	5637	5635	5634	5632	5630	5629	5627	5626	5624	273
274	5622	5621	5619	5618	5616	5615	5613	5611	5610	5608	274
275	5607	5605	5604	5602	5600	5599	5597	5596	5594	5592	275
276	5591	5589	5588	5586	5585	5583	5581	5580	5578	5577	276
277	5575	5574	5572	5570	5569	5567	5566	5564	5563	5561	277
278	5560	5558	5556	5555	5553	5552	5550	5549	5547	5546	278
279	5544	5542	5541	5539	5538	5536	5535	5533	5532	5530	279

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
280	5528	5527	5525	5524	5522	5521	5519	5518	5516	5514	280
281	5513	5511	5510	5508	5507	5505	5504	5502	5501	5499	281
282	5498	5496	5494	5493	5491	5490	5488	5487	5485	5484	282
283	5482	5481	5479	5478	5476	5474	5473	5471	5470	5468	283
284	5467	5465	5464	5462	5461	5459	5458	5456	5455	5453	284
285	5452	5450	5448	5447	5445	5444	5442	5441	5439	5438	285
286	5436	5435	5433	5432	5430	5429	5427	5426	5424	5423	286
287	5421	5420	5418	5417	5415	5414	5412	5411	5409	5408	287
288	5406	5405	5403	5402	5400	5399	5397	5396	5394	5393	288
289	5391	5390	5388	5387	5385	5384	5382	5381	5379	5378	289
290	5376	5375	5373	5372	5370	5369	5367	5366	5364	5363	290
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293	5331	5330	5328	5327	5325	5324	5322	5321	5319	5318	293
294	5317	5315	5314	5312	5311	5309	5308	5306	5305	5303	294
295	5302	5300	5299	5297	5296	5294	5293	5291	5290	5289	295
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297	5272	5271	5270	5268	5267	5265	5264	5262	5261	5259	297
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314	5031	5029	5028	5027	5025	5024	5022	5021	5020	5018	314
315	5017	5016	5014	5013	5011	5010	5009	5007	5006	5004	315
316	5003	5002	5000	4999	4998	4996	4995	4994	4992	4991	316
317	4989	4988	4987	4985	4984	4983	4981	4980	4978	4977	317
318	4976	4974	4973	4972	4970	4969	4968	4966	4965	4963	318
319	4962	4961	4959	4958	4957	4955	4954	4953	4951	4950	319
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321	4935	4934	4932	4931	4930	4928	4927	4925	4924	4923	321
322	4921	4920	4919	4917	4916	4915	4913	4912	4911	4909	322
323	4908	4907	4905	4904	4903	4901	4900	4899	4897	4896	323
324	4895	4893	4892	4891	4889	4888	4887	4885	4884	4882	324
325	4881	4880	4878	4877	4876	4874	4873	4872	4870	4869	325
326	4868	4866	4865	4864	4862	4861	4860	4859	4857	4856	326
327	4855	4853	4852	4851	4849	4848	4847	4845	4844	4843	327
328	4841	4840	4839	4837	4836	4835	4833	4832	4831	4829	328
329	4828	4827	4825	4824	4823	4821	4820	4819	4817	4816	329
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331	4802	4800	4799	4798	4796	4795	4794	4793	4791	4790	331
332	4789	4787	4786	4785	4783	4782	4781	4779	4778	4777	332
333	4776	4774	4773	4772	4770	4769	4768	4766	4765	4764	333
334	4763	4761	4760	4759	4757	4756	4755	4753	4752	4751	334
335	4750	4748	4747	4746	4744	4743	4742	4740	4739	4738	335
336	4737	4735	4734	4733	4731	4730	4729	4728	4726	4725	336
337	4724	4722	4721	4720	4719	4717	4716	4715	4713	4712	337
338	4711	4710	4708	4707	4706	4704	4703	4702	4701	4699	338
339	4698	4697	4695	4694	4693	4692	4690	4689	4688	4686	339

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341	4672	4671	4670	4669	4667	4666	4665	4664	4662	4661	341
342	4660	4658	4657	4656	4655	4653	4652	4651	4650	4648	342
343	4647	4646	4645	4643	4642	4641	4639	4638	4637	4636	343
344	4634	4633	4632	4631	4629	4628	4627	4626	4624	4623	344
345	4622	4621	4619	4618	4617	4616	4614	4613	4612	4610	345
346	4609	4608	4607	4605	4604	4603	4602	4600	4599	4598	346
347	4597	4595	4594	4593	4592	4590	4589	4588	4587	4585	347
348	4584	4583	4582	4580	4579	4578	4577	4575	4574	4573	348
349	4572	4570	4569	4568	4567	4566	4564	4563	4562	4561	349
350	4559	4558	4557	4556	4554	4553	4552	4551	4549	4548	350
351	4547	4546	4544	4543	4542	4541	4540	4538	4537	4536	351
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353	4522	4521	4520	4519	4517	4516	4515	4514	4512	4511	353
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356	4485	4484	4483	4482	4481	4479	4478	4477	4476	4475	356
357	4473	4472	4471	4470	4468	4467	4466	4465	4464	4462	357
358	4461	4460	4459	4458	4456	4455	4454	4453	4451	4450	358
359	4449	4448	4447	4445	4444	4443	4442	4441	4439	4438	359
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362	4413	4412	4411	4409	4408	4407	4406	4405	4403	4402	362
363	4401	4400	4399	4397	4396	4395	4394	4393	4391	4390	363
364	4389	4388	4387	4385	4384	4383	4382	4381	4379	4378	364
365	4377	4376	4375	4373	4372	4371	4370	4369	4368	4366	365
366	4365	4364	4363	4362	4360	4359	4358	4357	4356	4355	366
367	4353	4352	4351	4350	4349	4347	4346	4345	4344	4343	367
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369	4330	4329	4327	4326	4325	4324	4323	4322	4320	4319	369
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371	4306	4305	4304	4303	4302	4300	4299	4298	4297	4296	371
372	4295	4293	4292	4291	4290	4289	4288	4286	4285	4284	372
373	4283	4282	4281	4279	4278	4277	4276	4275	4274	4272	373
374	4271	4270	4269	4268	4267	4265	4264	4263	4262	4261	374
375	4260	4259	4257	4256	4255	4254	4253	4252	4250	4249	375
376	4248	4247	4246	4245	4243	4242	4241	4240	4239	4238	376
377	4237	4235	4234	4233	4232	4231	4230	4229	4227	4226	377
378	4225	4224	4223	4222	4220	4219	4218	4217	4216	4215	378
379	4214	4212	4211	4210	4209	4208	4207	4206	4204	4203	379
380	4202	4201	4200	4199	4198	4196	4195	4194	4193	4192	380
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382	4179	4178	4177	4176	4175	4174	4173	4171	4170	4169	382
383	4168	4167	4166	4165	4163	4162	4161	4160	4159	4158	383
384	4157	4156	4154	4153	4152	4151	4150	4149	4148	4147	384
385	4145	4144	4143	4142	4141	4140	4139	4137	4136	4135	385
386	4134	4133	4132	4131	4130	4129	4127	4126	4125	4124	386
387	4123	4122	4121	4120	4118	4117	4116	4115	4114	4113	387
388	4112	4111	4109	4108	4107	4106	4105	4104	4103	4102	388
389	4100	4099	4098	4097	4096	4095	4094	4093	4092	4090	389
390	4089	4088	4087	4086	4085	4084	4083	4082	4080	4079	390
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392	4067	4066	4065	4064	4063	4062	4060	4059	4058	4057	392
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394	4045	4044	4043	4042	4041	4040	4038	4037	4036	4035	394
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396	4023	4022	4021	4020	4019	4018	4016	4015	4014	4013	396
397	4012	4011	4010	4009	4008	4007	4006	4004	4003	4002	397
398	4001	4000	3999	3998	3997	3996	3995	3994	3992	3991	398
399	3990	3989	3988	3987	3986	3985	3984	3983	3982	3980	399

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Logarithmos auxiliares

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401	3969	3967	3966	3965	3964	3963	3962	3961	3960	3959	401
402	3958	3957	3956	3954	3953	3952	3951	3950	3949	3948	402
403	3947	3946	3945	3944	3943	3942	3940	3939	3938	3937	403
404	3936	3935	3934	3933	3932	3931	3930	3929	3928	3927	404
405	3925	3924	3923	3922	3921	3920	3919	3918	3917	3916	405
406	3915	3914	3913	3912	3910	3909	3908	3907	3906	3905	406
407	3904	3903	3902	3901	3900	3899	3898	3897	3896	3894	407
408	3893	3892	3891	3890	3889	3888	3887	3886	3885	3884	408
409	3883	3882	3881	3880	3879	3877	3876	3875	3874	3873	409
410	3872	3871	3870	3869	3868	3867	3866	3865	3864	3863	410
411	3862	3861	3859	3858	3857	3856	3855	3854	3853	3852	411
412	3851	3850	3849	3848	3847	3846	3845	3844	3843	3842	412
413	3840	3839	3838	3837	3836	3835	3834	3833	3832	3831	413
414	3830	3829	3828	3827	3826	3825	3824	3823	3822	3821	414
415	3820	3818	3817	3816	3815	3814	3813	3812	3811	3810	415
416	3809	3808	3807	3806	3805	3804	3803	3802	3801	3800	416
417	3799	3798	3797	3796	3794	3793	3792	3791	3790	3789	417
418	3788	3787	3786	3785	3784	3783	3782	3781	3780	3779	418
419	3778	3777	3776	3775	3774	3773	3772	3771	3770	3769	419
420	3768	3766	3765	3764	3763	3762	3761	3760	3759	3758	420
421	3757	3756	3755	3754	3753	3752	3751	3750	3749	3748	421
422	3747	3746	3745	3744	3743	3742	3741	3740	3739	3738	422
423	3737	3736	3735	3734	3732	3731	3730	3729	3728	3727	423
424	3726	3725	3724	3723	3722	3721	3720	3719	3718	3717	424
425	3716	3715	3714	3713	3712	3711	3710	3709	3708	3707	425
426	3706	3705	3704	3703	3702	3701	3700	3699	3698	3697	426
427	3696	3695	3694	3693	3692	3691	3690	3689	3688	3687	427
428	3686	3685	3684	3683	3682	3680	3679	3678	3677	3676	428
429	3675	3674	3673	3672	3671	3670	3669	3668	3667	3666	429
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431	3655	3654	3653	3652	3651	3650	3649	3648	3647	3646	431
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433	3635	3634	3633	3632	3631	3630	3629	3628	3627	3626	433
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437	3595	3594	3593	3592	3591	3590	3589	3588	3587	3586	437
438	3585	3584	3583	3582	3581	3580	3579	3578	3577	3576	438
439	3575	3574	3573	3572	3571	3570	3569	3568	3567	3566	439
440	3565	3564	3563	3563	3562	3561	3560	3559	3558	3557	440
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444	3526	3525	3524	3523	3522	3521	3520	3519	3518	3517	444
445	3516	3515	3514	3513	3512	3512	3511	3510	3509	3508	445
446	3507	3506	3505	3504	3503	3502	3501	3500	3499	3498	446
447	3497	3496	3495	3494	3493	3492	3491	3490	3489	3488	447
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449	3478	3477	3476	3475	3474	3473	3472	3471	3470	3469	449
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451	3458	3457	3456	3455	3454	3453	3452	3451	3451	3450	451
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456	3410	3409	3408	3407	3407	3406	3405	3404	3403	3402	456
457	3401	3400	3399	3398	3397	3396	3395	3394	3393	3392	457
458	3391	3390	3389	3388	3388	3387	3386	3385	3384	3383	458
459	3382	3381	3380	3379	3378	3377	3376	3375	3374	3373	459

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Logarithmos auxiliares

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N.	0	1	2	3	4	5	6	7	8	9	N.
460	3372	3371	3371	3370	3369	3368	3367	3366	3365	3364	460
461	3363	3362	3361	3360	3359	3358	3357	3356	3355	3355	461
462	3354	3353	3352	3351	3350	3349	3348	3347	3346	3345	462
463	3344	3343	3342	3341	3340	3339	3339	3338	3337	3336	463
464	3335	3334	3333	3332	3331	3330	3329	3328	3327	3326	464
465	3325	3325	3324	3323	3322	3321	3320	3319	3318	3317	465
466	3316	3315	3314	3313	3312	3311	3311	3310	3309	3308	466
467	3307	3306	3305	3304	3303	3302	3301	3300	3299	3298	467
468	3298	3297	3296	3295	3294	3293	3292	3291	3290	3289	468
469	3288	3287	3286	3285	3285	3284	3283	3282	3281	3280	469
470	3279	3278	3277	3276	3275	3274	3273	3273	3272	3271	470
471	3270	3269	3268	3267	3266	3265	3264	3263	3262	3261	471
472	3261	3260	3259	3258	3257	3256	3255	3254	3253	3252	472
473	3251	3250	3250	3249	3248	3247	3246	3245	3244	3243	473
474	3242	3241	3240	3239	3239	3238	3237	3236	3235	3234	474
475	3233	3232	3231	3230	3229	3228	3228	3227	3226	3225	475
476	3224	3223	3222	3221	3220	3219	3218	3218	3217	3216	476
477	3215	3214	3213	3212	3211	3210	3209	3208	3208	3207	477
478	3206	3205	3204	3203	3202	3201	3200	3199	3198	3198	478
479	3197	3196	3195	3194	3193	3192	3191	3190	3189	3188	479
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481	3179	3178	3177	3176	3175	3174	3173	3172	3171	3170	481
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483	3161	3160	3159	3158	3157	3156	3155	3154	3153	3152	483
484	3152	3151	3150	3149	3148	3147	3146	3145	3144	3143	484
485	3143	3142	3141	3140	3139	3138	3137	3136	3135	3135	485
486	3134	3133	3132	3131	3130	3129	3128	3127	3126	3126	486
487	3125	3124	3123	3122	3121	3120	3119	3118	3118	3117	487
488	3116	3115	3114	3113	3112	3111	3110	3110	3109	3108	488
489	3107	3106	3105	3104	3103	3102	3102	3101	3100	3099	489
490	3098	3097	3096	3095	3094	3094	3093	3092	3091	3090	490
491	3089	3088	3087	3087	3086	3085	3084	3083	3082	3081	491
492	3080	3079	3079	3078	3077	3076	3075	3074	3073	3072	492
493	3072	3071	3070	3069	3068	3067	3066	3065	3064	3064	493
494	3063	3062	3061	3060	3059	3058	3057	3057	3056	3055	494
495	3054	3053	3052	3051	3050	3050	3049	3048	3047	3046	495
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501	3002	3001	3000	2999	2998	2997	2996	2996	2995	2994	501
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504	2976	2975	2974	2973	2972	2971	2971	2970	2969	2968	504
505	2967	2966	2965	2965	2964	2963	2962	2961	2960	2959	505
506	2958	2958	2957	2956	2955	2954	2953	2952	2952	2951	506
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508	2941	2941	2940	2939	2938	2937	2936	2935	2935	2934	508
509	2933	2932	2931	2930	2929	2929	2928	2927	2926	2925	509
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Logarithmos auxiliares

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577	2388	2387	2387	2386	2385	2384	2384	2383	2382	2381	577
578	2381	2380	2379	2378	2378	2377	2376	2375	2375	2374	578
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606	2175	2175	2174	2173	2172	2172	2171	2170	2170	2169	606
607	2168	2167	2167	2166	2165	2165	2164	2163	2162	2162	607
608	2161	2160	2160	2159	2158	2157	2157	2156	2155	2155	608
609	2154	2153	2152	2152	2151	2150	2150	2149	2148	2147	609
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613	2125	2125	2124	2123	2123	2122	2121	2120	2120	2119	613
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620	2076	2075	2075	2074	2073	2073	2072	2071	2070	2070	620
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Logarithmos auxiliares

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710	1487	1487	1486	1486	1485	1484	1484	1483	1483	1482	710
711	1481	1481	1480	1479	1479	1478	1478	1477	1476	1476	711
712	1475	1475	1474	1473	1473	1472	1472	1471	1470	1470	712
713	1469	1468	1468	1467	1467	1466	1465	1465	1464	1464	713
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718	1439	1438	1438	1437	1436	1436	1435	1435	1434	1433	718
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721	1421	1420	1419	1419	1418	1418	1417	1416	1416	1415	721
722	1415	1414	1413	1413	1412	1412	1411	1410	1410	1409	722
723	1409	1408	1407	1407	1406	1406	1405	1404	1404	1403	723
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732	1355	1354	1354	1353	1353	1352	1351	1351	1350	1350	732
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737	1325	1325	1324	1324	1323	1322	1322	1321	1321	1320	737
738	1319	1319	1318	1318	1317	1316	1316	1315	1315	1314	738
739	1314	1313	1312	1312	1311	1311	1310	1309	1309	1308	739
740	1308	1307	1307	1306	1305	1305	1304	1304	1303	1302	740
741	1302	1301	1301	1300	1299	1299	1298	1298	1297	1297	741
742	1296	1295	1295	1294	1294	1293	1292	1292	1291	1291	742
743	1290	1290	1289	1288	1288	1287	1287	1286	1285	1285	743
744	1284	1284	1283	1283	1282	1281	1281	1280	1280	1279	744
745	1278	1278	1277	1277	1276	1276	1275	1274	1274	1273	745
746	1273	1272	1271	1271	1270	1270	1269	1269	1268	1267	746
747	1267	1266	1266	1265	1264	1264	1263	1263	1262	1262	747
748	1261	1260	1260	1259	1259	1258	1257	1257	1256	1256	748
749	1255	1255	1254	1253	1253	1252	1252	1251	1251	1250	749
750	1249	1249	1248	1248	1247	1246	1246	1245	1245	1244	750
751	1244	1243	1242	1242	1241	1241	1240	1240	1239	1238	751
752	1238	1237	1237	1236	1236	1235	1234	1234	1233	1233	752
753	1232	1231	1231	1230	1230	1229	1229	1228	1227	1227	753
754	1226	1226	1225	1225	1224	1223	1223	1222	1222	1221	754
755	1221	1220	1219	1219	1218	1218	1217	1217	1216	1215	755
756	1215	1214	1214	1213	1212	1212	1211	1211	1210	1210	756
757	1209	1208	1208	1207	1207	1206	1206	1205	1204	1204	757
758	1203	1203	1202	1202	1201	1200	1200	1199	1199	1198	758
759	1198	1197	1196	1196	1195	1195	1194	1194	1193	1192	759

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
760	1192	1191	1191	1190	1190	1189	1188	1188	1187	1187	760
761	1186	1186	1185	1184	1184	1183	1183	1182	1182	1181	761
762	1180	1180	1179	1179	1178	1178	1177	1176	1176	1175	762
763	1175	1174	1174	1173	1172	1172	1171	1171	1170	1170	763
764	1169	1168	1168	1167	1167	1166	1166	1165	1165	1164	764
765	1163	1163	1162	1162	1161	1161	1160	1159	1159	1158	765
766	1158	1157	1157	1156	1155	1155	1154	1154	1153	1153	766
767	1152	1151	1151	1150	1150	1149	1149	1148	1148	1147	767
768	1146	1146	1145	1145	1144	1144	1143	1142	1142	1141	768
769	1141	1140	1140	1139	1138	1138	1137	1137	1136	1136	769
770	1135	1135	1134	1133	1133	1132	1132	1131	1131	1130	770
771	1129	1129	1128	1128	1127	1127	1126	1126	1125	1124	771
772	1124	1123	1123	1122	1122	1121	1120	1120	1119	1119	772
773	1118	1118	1117	1117	1116	1115	1115	1114	1114	1113	773
774	1113	1112	1111	1111	1110	1110	1109	1109	1108	1108	774
775	1107	1106	1106	1105	1105	1104	1104	1103	1102	1102	775
776	1101	1101	1100	1100	1099	1099	1098	1097	1097	1096	776
777	1096	1095	1095	1094	1094	1093	1092	1092	1091	1091	777
778	1090	1090	1089	1089	1088	1087	1087	1086	1086	1085	778
779	1085	1084	1084	1083	1082	1082	1081	1081	1080	1080	779
780	1079	1078	1078	1077	1077	1076	1076	1075	1075	1074	780
781	1073	1073	1072	1072	1071	1071	1070	1070	1069	1068	781
782	1068	1067	1067	1066	1066	1065	1065	1064	1063	1063	782
783	1062	1062	1061	1061	1060	1060	1059	1058	1058	1057	783
784	1057	1056	1056	1055	1055	1054	1054	1053	1052	1052	784
785	1051	1051	1050	1050	1049	1049	1048	1047	1047	1046	785
786	1046	1045	1045	1044	1044	1043	1042	1042	1041	1041	786
787	1040	1040	1039	1039	1038	1037	1037	1036	1036	1035	787
788	1035	1034	1034	1033	1033	1032	1031	1031	1030	1030	788
789	1029	1029	1028	1028	1027	1026	1026	1025	1025	1024	789
790	1024	1023	1023	1022	1022	1021	1020	1020	1019	1019	790
791	1018	1018	1017	1017	1016	1015	1015	1014	1014	1013	791
792	1013	1012	1012	1011	1011	1010	1009	1009	1008	1008	792
793	1007	1007	1006	1006	1005	1005	1004	1003	1003	1002	793
794	1002	1001	1001	1000	1000	0999	0999	0998	0997	0997	794
795	0996	0996	0995	0995	0994	0994	0993	0993	0992	0991	795
796	0991	0990	0990	0989	0989	0988	0988	0987	0987	0986	796
797	0985	0985	0984	0984	0983	0983	0982	0982	0981	0981	797
798	0980	0979	0979	0978	0978	0977	0977	0976	0976	0975	798
799	0975	0974	0973	0973	0972	0972	0971	0971	0970	0970	799
800	0969	0969	0968	0967	0967	0966	0966	0965	0965	0964	800
801	0964	0963	0963	0962	0962	0961	0960	0960	0959	0959	801
802	0958	0958	0957	0957	0956	0956	0955	0954	0954	0953	802
803	0953	0952	0952	0951	0951	0950	0950	0949	0949	0948	803
804	0947	0947	0946	0946	0945	0945	0944	0944	0943	0943	804
805	0942	0941	0941	0940	0940	0939	0939	0938	0938	0937	805
806	0937	0936	0936	0935	0934	0934	0933	0933	0932	0932	806
807	0931	0931	0930	0930	0929	0929	0928	0927	0927	0926	807
808	0926	0925	0925	0924	0924	0923	0923	0922	0922	0921	808
809	0921	0920	0919	0919	0918	0918	0917	0917	0916	0916	809
810	0915	0915	0914	0914	0913	0912	0912	0911	0911	0910	810
811	0910	0909	0909	0908	0908	0907	0907	0906	0906	0905	811
812	0904	0904	0903	0903	0902	0902	0901	0901	0900	0900	812
813	0899	0899	0898	0897	0897	0896	0896	0895	0895	0894	813
814	0894	0893	0893	0892	0892	0891	0891	0890	0889	0889	814
815	0888	0888	0887	0887	0886	0886	0885	0885	0884	0884	815
816	0883	0883	0882	0881	0881	0880	0880	0879	0879	0878	816
817	0878	0877	0877	0876	0876	0875	0875	0874	0874	0873	817
818	0872	0872	0871	0871	0870	0870	0869	0869	0868	0868	818
819	0867	0867	0866	0866	0865	0865	0864	0863	0863	0862	819

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
700	1549	1548	1548	1547	1547	1546	1545	1545	1544	1543	700
701	1543	1542	1542	1541	1540	1540	1539	1538	1538	1537	701
702	1537	1536	1535	1535	1534	1534	1533	1532	1532	1531	702
703	1530	1530	1529	1529	1528	1527	1527	1526	1526	1525	703
704	1524	1524	1523	1522	1522	1521	1521	1520	1519	1519	704
705	1518	1517	1517	1516	1516	1515	1514	1514	1513	1513	705
706	1512	1511	1511	1510	1509	1509	1508	1508	1507	1506	706
707	1506	1505	1505	1504	1503	1503	1502	1502	1501	1500	707
708	1500	1499	1498	1498	1497	1497	1496	1495	1495	1494	708
709	1494	1493	1492	1492	1491	1490	1490	1489	1489	1488	709
710	1487	1487	1486	1486	1485	1484	1484	1483	1483	1482	710
711	1481	1481	1480	1479	1479	1478	1478	1477	1476	1476	711
712	1475	1475	1474	1473	1473	1472	1472	1471	1470	1470	712
713	1469	1468	1468	1467	1467	1466	1465	1465	1464	1464	713
714	1463	1462	1462	1461	1461	1460	1459	1459	1458	1458	714
715	1457	1456	1456	1455	1455	1454	1453	1453	1452	1451	715
716	1451	1450	1450	1449	1448	1448	1447	1447	1446	1445	716
717	1445	1444	1444	1443	1442	1442	1441	1441	1440	1439	717
718	1439	1438	1438	1437	1436	1436	1435	1435	1434	1433	718
719	1433	1432	1431	1431	1430	1430	1429	1428	1428	1427	719
720	1427	1426	1425	1425	1424	1424	1423	1422	1422	1421	720
721	1421	1420	1419	1419	1418	1418	1417	1416	1416	1415	721
722	1415	1414	1413	1413	1412	1412	1411	1410	1410	1409	722
723	1409	1408	1407	1407	1406	1406	1405	1404	1404	1403	723
724	1403	1402	1401	1401	1400	1400	1399	1398	1398	1397	724
725	1397	1396	1395	1395	1394	1394	1393	1392	1392	1391	725
726	1391	1390	1389	1389	1388	1388	1387	1386	1386	1385	726
727	1385	1384	1383	1383	1382	1382	1381	1380	1380	1379	727
728	1379	1378	1377	1377	1376	1376	1375	1375	1374	1373	728
729	1373	1372	1372	1371	1370	1370	1369	1369	1368	1367	729
730	1367	1366	1366	1365	1364	1364	1363	1363	1362	1361	730
731	1361	1360	1360	1359	1358	1358	1357	1357	1356	1355	731
732	1355	1354	1354	1353	1353	1352	1351	1351	1350	1350	732
733	1349	1348	1348	1347	1347	1346	1345	1345	1344	1344	733
734	1343	1342	1342	1341	1341	1340	1339	1339	1338	1338	734
735	1337	1337	1336	1335	1335	1334	1334	1333	1332	1332	735
736	1331	1331	1330	1329	1329	1328	1328	1327	1326	1326	736
737	1325	1325	1324	1324	1323	1322	1322	1321	1321	1320	737
738	1319	1319	1318	1318	1317	1316	1316	1315	1315	1314	738
739	1314	1313	1312	1312	1311	1311	1310	1309	1309	1308	739
740	1308	1307	1307	1306	1305	1305	1304	1304	1303	1302	740
741	1302	1301	1301	1300	1299	1299	1298	1298	1297	1297	741
742	1296	1295	1295	1294	1294	1293	1292	1292	1291	1291	742
743	1290	1290	1289	1288	1288	1287	1287	1286	1285	1285	743
744	1284	1284	1283	1283	1282	1281	1281	1280	1280	1279	744
745	1278	1278	1277	1277	1276	1276	1275	1274	1274	1273	745
746	1273	1272	1271	1271	1270	1270	1269	1269	1268	1267	746
747	1267	1266	1266	1265	1264	1264	1263	1263	1262	1262	747
748	1261	1260	1260	1259	1259	1258	1257	1257	1256	1256	748
749	1255	1255	1254	1253	1253	1252	1252	1251	1251	1250	749
750	1249	1249	1248	1248	1247	1246	1246	1245	1245	1244	750
751	1244	1243	1242	1242	1241	1241	1240	1240	1239	1238	751
752	1238	1237	1237	1236	1236	1235	1234	1234	1233	1233	752
753	1232	1231	1231	1230	1230	1229	1229	1228	1227	1227	753
754	1226	1226	1225	1225	1224	1223	1223	1222	1222	1221	754
755	1221	1220	1219	1219	1218	1218	1217	1217	1216	1215	755
756	1215	1214	1214	1213	1212	1212	1211	1211	1210	1210	756
757	1209	1208	1208	1207	1207	1206	1206	1205	1204	1204	757
758	1203	1203	1202	1202	1201	1200	1200	1199	1199	1198	758
759	1198	1197	1196	1196	1195	1195	1194	1194	1193	1192	759

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
760	1192	1191	1191	1190	1190	1189	1188	1188	1187	1187	760
761	1186	1186	1185	1184	1184	1183	1183	1182	1182	1181	761
762	1180	1180	1179	1179	1178	1178	1177	1176	1176	1175	762
763	1175	1174	1174	1173	1172	1172	1171	1171	1170	1170	763
764	1169	1168	1168	1167	1167	1166	1166	1165	1165	1164	764
765	1163	1163	1162	1162	1161	1161	1160	1159	1159	1158	765
766	1158	1157	1157	1156	1155	1155	1154	1154	1153	1153	766
767	1152	1151	1151	1150	1150	1149	1149	1148	1148	1147	767
768	1146	1146	1145	1145	1144	1144	1143	1142	1142	1141	768
769	1141	1140	1140	1139	1138	1138	1137	1137	1136	1136	769
770	1135	1135	1134	1133	1133	1132	1132	1131	1131	1130	770
771	1129	1129	1128	1128	1127	1127	1126	1126	1125	1124	771
772	1124	1123	1123	1122	1122	1121	1120	1120	1119	1119	772
773	1118	1118	1117	1117	1116	1115	1115	1114	1114	1113	773
774	1113	1112	1111	1111	1110	1110	1109	1109	1108	1108	774
775	1107	1106	1106	1105	1105	1104	1104	1103	1102	1102	775
776	1101	1101	1100	1100	1099	1099	1098	1097	1097	1096	776
777	1096	1095	1095	1094	1094	1093	1092	1092	1091	1091	777
778	1090	1090	1089	1089	1088	1087	1087	1086	1086	1085	778
779	1085	1084	1084	1083	1082	1082	1081	1081	1080	1080	779
780	1079	1078	1078	1077	1077	1076	1076	1075	1075	1074	780
781	1073	1073	1072	1072	1071	1071	1070	1070	1069	1068	781
782	1068	1067	1067	1066	1066	1065	1065	1064	1063	1063	782
783	1062	1062	1061	1061	1060	1060	1059	1058	1058	1057	783
784	1057	1056	1056	1055	1055	1054	1054	1053	1052	1052	784
785	1051	1051	1050	1050	1049	1049	1048	1047	1047	1046	785
786	1046	1045	1045	1044	1044	1043	1042	1042	1041	1041	786
787	1040	1040	1039	1039	1038	1037	1037	1036	1036	1035	787
788	1035	1034	1034	1033	1033	1032	1031	1031	1030	1030	788
789	1029	1029	1028	1028	1027	1026	1026	1025	1025	1024	789
790	1024	1023	1023	1022	1022	1021	1020	1020	1019	1019	790
791	1018	1018	1017	1017	1016	1015	1015	1014	1014	1013	791
792	1013	1012	1012	1011	1011	1010	1009	1009	1008	1008	792
793	1007	1007	1006	1006	1005	1005	1004	1003	1003	1002	793
794	1002	1001	1001	1000	1000	0999	0999	0998	0997	0997	794
795	0996	0996	0995	0995	0994	0994	0993	0993	0992	0991	795
796	0991	0990	0990	0989	0989	0988	0988	0987	0987	0986	796
797	0985	0985	0984	0984	0983	0983	0982	0982	0981	0981	797
798	0980	0979	0979	0978	0978	0977	0977	0976	0976	0975	798
799	0975	0974	0973	0973	0972	0972	0971	0971	0970	0970	799
800	0969	0969	0968	0967	0967	0966	0966	0965	0965	0964	800
801	0964	0963	0963	0962	0962	0961	0960	0960	0959	0959	801
802	0958	0958	0957	0957	0956	0956	0955	0954	0954	0953	802
803	0953	0952	0952	0951	0951	0950	0950	0949	0949	0948	803
804	0947	0947	0946	0946	0945	0945	0944	0944	0943	0943	804
805	0942	0941	0941	0940	0940	0939	0939	0938	0938	0937	805
806	0937	0936	0936	0935	0934	0934	0933	0933	0932	0932	806
807	0931	0931	0930	0930	0929	0929	0928	0927	0927	0926	807
808	0926	0925	0925	0924	0924	0923	0923	0922	0922	0921	808
809	0921	0920	0919	0919	0918	0918	0917	0917	0916	0916	809
810	0915	0915	0914	0914	0913	0912	0912	0911	0911	0910	810
811	0910	0909	0909	0908	0908	0907	0907	0906	0906	0905	811
812	0904	0904	0903	0903	0902	0902	0901	0901	0900	0900	812
813	0899	0899	0898	0897	0897	0896	0896	0895	0895	0894	813
814	0894	0893	0893	0892	0892	0891	0891	0890	0889	0889	814
815	0888	0888	0887	0887	0886	0886	0885	0885	0884	0884	815
816	0883	0883	0882	0881	0881	0880	0880	0879	0879	0878	816
817	0878	0877	0877	0876	0876	0875	0875	0874	0874	0873	817
818	0872	0872	0871	0871	0870	0870	0869	0869	0868	0868	818
819	0867	0867	0866	0866	0865	0865	0864	0863	0863	0862	819

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
820	0862	0861	0861	0860	0860	0859	0859	0858	0858	0857	820
821	0857	0856	0856	0855	0854	0854	0853	0853	0852	0852	821
822	0851	0851	0850	0850	0849	0849	0848	0848	0847	0847	822
823	0846	0845	0845	0844	0844	0843	0843	0842	0842	0841	823
824	0841	0840	0840	0839	0839	0838	0838	0837	0837	0836	824
825	0835	0835	0834	0834	0833	0833	0832	0832	0831	0831	825
826	0830	0830	0829	0829	0828	0828	0827	0827	0826	0825	826
827	0825	0824	0824	0823	0823	0822	0822	0821	0821	0820	827
828	0820	0819	0819	0818	0818	0817	0817	0816	0816	0815	828
829	0814	0814	0813	0813	0812	0812	0811	0811	0810	0810	829
830	0809	0809	0808	0808	0807	0807	0806	0806	0805	0805	830
831	0804	0803	0803	0802	0802	0801	0801	0800	0800	0799	831
832	0799	0798	0798	0797	0797	0796	0796	0795	0795	0794	832
833	0794	0793	0793	0792	0791	0791	0790	0790	0789	0789	833
834	0788	0788	0787	0787	0786	0786	0785	0785	0784	0784	834
835	0783	0783	0782	0782	0781	0781	0780	0779	0779	0778	835
836	0778	0777	0777	0776	0776	0775	0775	0774	0774	0773	836
837	0773	0772	0772	0771	0771	0770	0770	0769	0769	0768	837
838	0768	0767	0767	0766	0765	0765	0764	0764	0763	0763	838
839	0762	0762	0761	0761	0760	0760	0759	0759	0758	0758	839
840	0757	0757	0756	0756	0755	0755	0754	0754	0753	0753	840
841	0752	0752	0751	0750	0750	0749	0749	0748	0748	0747	841
842	0747	0746	0746	0745	0745	0744	0744	0743	0743	0742	842
843	0742	0741	0741	0740	0740	0739	0739	0738	0738	0737	843
844	0737	0736	0736	0735	0735	0734	0733	0733	0732	0732	844
845	0731	0731	0730	0730	0729	0729	0728	0728	0727	0727	845
846	0726	0726	0725	0725	0724	0724	0723	0723	0722	0722	846
847	0721	0721	0720	0720	0719	0719	0718	0718	0717	0717	847
848	0716	0716	0715	0715	0714	0713	0713	0712	0712	0711	848
849	0711	0710	0710	0709	0709	0708	0708	0707	0707	0706	849
850	0706	0705	0705	0704	0704	0703	0703	0702	0702	0701	850
851	0701	0700	0700	0699	0699	0698	0698	0697	0697	0696	851
852	0696	0695	0695	0694	0694	0693	0693	0692	0692	0691	852
853	0691	0690	0689	0689	0688	0688	0687	0687	0686	0686	853
854	0685	0685	0684	0684	0683	0683	0682	0682	0681	0681	854
855	0680	0680	0679	0679	0678	0678	0677	0677	0676	0676	855
856	0675	0675	0674	0674	0673	0673	0672	0672	0671	0671	856
857	0670	0670	0669	0669	0668	0668	0667	0667	0666	0666	857
858	0665	0665	0664	0664	0663	0663	0662	0662	0661	0661	858
859	0660	0660	0659	0659	0658	0658	0657	0657	0656	0656	859
860	0655	0655	0654	0653	0653	0652	0652	0651	0651	0650	860
861	0650	0649	0649	0648	0648	0647	0647	0646	0646	0645	861
862	0645	0644	0644	0643	0643	0642	0642	0641	0641	0640	862
863	0640	0639	0639	0638	0638	0637	0637	0636	0636	0635	863
864	0635	0634	0634	0633	0633	0632	0632	0631	0631	0630	864
865	0630	0629	0629	0628	0628	0627	0627	0626	0626	0625	865
866	0625	0624	0624	0623	0623	0622	0622	0621	0621	0620	866
867	0620	0619	0619	0618	0618	0617	0617	0616	0616	0615	867
868	0615	0614	0614	0613	0613	0612	0612	0611	0611	0610	868
869	0610	0609	0609	0608	0608	0607	0607	0606	0606	0605	869
870	0605	0604	0604	0603	0603	0602	0602	0601	0601	0600	870
871	0600	0599	0599	0598	0598	0597	0597	0596	0596	0595	871
872	0595	0594	0594	0593	0593	0592	0592	0591	0591	0590	872
873	0590	0589	0589	0588	0588	0587	0587	0586	0586	0585	873
874	0585	0584	0584	0583	0583	0582	0582	0581	0581	0580	874
875	0580	0579	0579	0578	0578	0577	0577	0576	0576	0575	875
876	0575	0574	0574	0573	0573	0572	0572	0571	0571	0570	876
877	0570	0570	0569	0569	0568	0568	0567	0567	0566	0566	877
878	0565	0565	0564	0564	0563	0563	0562	0562	0561	0561	878
879	0560	0560	0559	0559	0558	0558	0557	0557	0556	0556	879

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
880	0555	0555	0554	0554	0553	0553	0552	0552	0551	0551	880
881	0550	0550	0549	0549	0548	0548	0547	0547	0546	0546	881
882	0545	0545	0544	0544	0543	0543	0542	0542	0541	0541	882
883	0540	0540	0539	0539	0538	0538	0537	0537	0536	0536	883
884	0535	0535	0534	0534	0534	0533	0533	0532	0532	0531	884
885	0531	0530	0530	0529	0529	0528	0528	0527	0527	0526	885
886	0526	0525	0525	0524	0524	0523	0523	0522	0522	0521	886
887	0521	0520	0520	0519	0519	0518	0518	0517	0517	0516	887
888	0516	0515	0515	0514	0514	0513	0513	0512	0512	0511	888
889	0511	0510	0510	0510	0509	0509	0508	0508	0507	0507	889
890	0506	0506	0505	0505	0504	0504	0503	0503	0502	0502	890
891	0501	0501	0500	0500	0499	0499	0498	0498	0497	0497	891
892	0496	0496	0495	0495	0494	0494	0493	0493	0492	0492	892
893	0491	0491	0491	0490	0490	0489	0489	0488	0488	0487	893
894	0487	0486	0486	0485	0485	0484	0484	0483	0483	0482	894
895	0482	0481	0481	0480	0480	0479	0479	0478	0478	0477	895
896	0477	0476	0476	0475	0475	0474	0474	0474	0473	0473	896
897	0472	0472	0471	0471	0470	0470	0469	0469	0468	0468	897
898	0467	0467	0466	0466	0465	0465	0464	0464	0463	0463	898
899	0462	0462	0461	0461	0460	0460	0460	0459	0459	0458	899
900	0458	0457	0457	0456	0456	0455	0455	0454	0454	0453	900
901	0453	0452	0452	0451	0451	0450	0450	0449	0449	0448	901
902	0448	0447	0447	0446	0446	0446	0445	0445	0444	0444	902
903	0443	0443	0442	0442	0441	0441	0440	0440	0439	0439	903
904	0438	0438	0437	0437	0436	0436	0435	0435	0434	0434	904
905	0434	0433	0433	0432	0432	0431	0431	0430	0430	0429	905
906	0429	0428	0428	0427	0427	0426	0426	0425	0425	0424	906
907	0424	0423	0423	0422	0422	0422	0421	0421	0420	0420	907
908	0419	0419	0418	0418	0417	0417	0416	0416	0415	0415	908
909	0414	0414	0413	0413	0412	0412	0411	0411	0411	0410	909
910	0410	0409	0409	0408	0408	0407	0407	0406	0406	0405	910
911	0405	0404	0404	0403	0403	0402	0402	0401	0401	0401	911
912	0400	0400	0399	0399	0398	0398	0397	0397	0396	0396	912
913	0395	0395	0394	0394	0393	0393	0392	0392	0391	0391	913
914	0391	0390	0390	0389	0389	0388	0388	0387	0387	0386	914
915	0386	0385	0385	0384	0384	0383	0383	0382	0382	0382	915
916	0381	0381	0380	0380	0379	0379	0378	0378	0377	0377	916
917	0376	0376	0375	0375	0374	0374	0373	0373	0373	0372	917
918	0372	0371	0371	0370	0370	0369	0369	0368	0368	0367	918
919	0367	0366	0366	0365	0365	0364	0364	0364	0363	0363	919
920	0362	0362	0361	0361	0360	0360	0359	0359	0358	0358	920
921	0357	0357	0356	0356	0356	0355	0355	0354	0354	0353	921
922	0353	0352	0352	0351	0351	0350	0350	0349	0349	0348	922
923	0348	0348	0347	0347	0346	0346	0345	0345	0344	0344	923
924	0343	0343	0342	0342	0341	0341	0340	0340	0340	0339	924
925	0339	0338	0338	0337	0337	0336	0336	0335	0335	0334	925
926	0334	0333	0333	0332	0332	0332	0331	0331	0330	0330	926
927	0329	0329	0328	0328	0327	0327	0326	0326	0325	0325	927
928	0325	0324	0324	0323	0323	0322	0322	0321	0321	0320	928
929	0320	0319	0319	0318	0318	0318	0317	0317	0316	0316	929
930	0315	0315	0314	0314	0313	0313	0312	0312	0311	0311	930
931	0310	0310	0310	0309	0309	0308	0308	0307	0307	0306	931
932	0306	0305	0305	0304	0304	0304	0303	0303	0302	0302	932
933	0301	0301	0300	0300	0299	0299	0298	0298	0297	0297	933
934	0297	0296	0296	0295	0295	0294	0294	0293	0293	0292	934
935	0292	0291	0291	0290	0290	0290	0289	0289	0288	0288	935
936	0287	0287	0286	0286	0285	0285	0284	0284	0284	0283	936
937	0283	0282	0282	0281	0281	0280	0280	0279	0279	0278	937
938	0278	0278	0277	0277	0276	0276	0275	0275	0274	0274	938
939	0273	0273	0272	0272	0271	0271	0271	0270	0270	0269	939

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Logarithmos auxiliares

T. Y)

N.	0	1	2	3	4	5	6	7	8	9	N.
940	0269	0268	0268	0267	0267	0266	0266	0265	0265	0265	940
941	0264	0264	0263	0263	0262	0262	0261	0261	0260	0260	941
942	0259	0259	0259	0258	0258	0257	0257	0256	0256	0255	942
943	0255	0254	0254	0253	0253	0253	0252	0252	0251	0251	943
944	0250	0250	0249	0249	0248	0248	0248	0247	0247	0246	944
945	0246	0245	0245	0244	0244	0243	0243	0242	0242	0242	945
946	0241	0241	0240	0240	0239	0239	0238	0238	0237	0237	946
947	0236	0236	0236	0235	0235	0234	0234	0233	0233	0232	947
948	0232	0231	0231	0231	0230	0230	0229	0229	0228	0228	948
949	0227	0227	0226	0226	0226	0225	0225	0224	0224	0223	949
950	0223	0222	0222	0221	0221	0220	0220	0220	0219	0219	950
951	0218	0218	0217	0217	0216	0216	0215	0215	0215	0214	951
952	0214	0213	0213	0212	0212	0211	0211	0210	0210	0210	952
953	0209	0209	0208	0208	0207	0207	0206	0206	0205	0205	953
954	0205	0204	0204	0203	0203	0202	0202	0201	0201	0200	954
955	0200	0200	0199	0199	0198	0198	0197	0197	0196	0196	955
956	0195	0195	0195	0194	0194	0193	0193	0192	0192	0191	956
957	0191	0190	0190	0190	0189	0189	0188	0188	0187	0187	957
958	0186	0186	0185	0185	0185	0184	0184	0183	0183	0182	958
959	0182	0181	0181	0180	0180	0180	0179	0179	0178	0178	959
960	0177	0177	0176	0176	0175	0175	0175	0174	0174	0173	960
961	0173	0172	0172	0171	0171	0171	0170	0170	0169	0169	961
962	0168	0168	0167	0167	0166	0166	0166	0165	0165	0164	962
963	0164	0163	0163	0162	0162	0161	0161	0161	0160	0160	963
964	0159	0159	0158	0158	0157	0157	0157	0156	0156	0155	964
965	0155	0154	0154	0153	0153	0152	0152	0152	0151	0151	965
966	0150	0150	0149	0149	0148	0148	0148	0147	0147	0146	966
967	0146	0145	0145	0144	0144	0143	0143	0143	0142	0142	967
968	0141	0141	0140	0140	0139	0139	0139	0138	0138	0137	968
969	0137	0136	0136	0135	0135	0135	0134	0134	0133	0133	969
970	0132	0132	0131	0131	0130	0130	0130	0129	0129	0128	970
971	0128	0127	0127	0126	0126	0126	0125	0125	0124	0124	971
972	0123	0123	0122	0122	0122	0121	0121	0120	0120	0119	972
973	0119	0118	0118	0118	0117	0117	0116	0116	0115	0115	973
974	0114	0114	0114	0113	0113	0112	0112	0111	0111	0110	974
975	0110	0110	0109	0109	0108	0108	0107	0107	0106	0106	975
976	0105	0105	0105	0104	0104	0103	0103	0102	0102	0101	976
977	0101	0101	0100	0100	0099	0099	0098	0098	0097	0097	977
978	0097	0096	0096	0095	0095	0094	0094	0093	0093	0093	978
979	0092	0092	0091	0091	0090	0090	0090	0089	0089	0088	979
980	0088	0087	0087	0086	0086	0086	0085	0085	0084	0084	980
981	0083	0083	0082	0082	0082	0081	0081	0080	0080	0079	981
982	0079	0078	0078	0078	0077	0077	0076	0076	0075	0075	982
983	0074	0074	0074	0073	0073	0072	0072	0071	0071	0070	983
984	0070	0070	0069	0069	0068	0068	0067	0067	0067	0066	984
985	0066	0065	0065	0064	0064	0063	0063	0063	0062	0062	985
986	0061	0061	0060	0060	0059	0059	0059	0058	0058	0057	986
987	0057	0056	0056	0056	0055	0055	0054	0054	0053	0053	987
988	0052	0052	0052	0051	0051	0050	0050	0049	0049	0048	988
989	0048	0048	0047	0047	0046	0046	0045	0045	0045	0044	989
990	0044	0043	0043	0042	0042	0041	0041	0041	0040	0040	990
991	0039	0039	0038	0038	0038	0037	0037	0036	0036	0035	991
992	0035	0034	0034	0034	0033	0033	0032	0032	0031	0031	992
993	0031	0030	0030	0029	0029	0028	0028	0027	0027	0027	993
994	0026	0026	0025	0025	0024	0024	0024	0023	0023	0022	994
995	0022	0021	0021	0020	0020	0020	0019	0019	0018	0018	995
996	0017	0017	0017	0016	0016	0015	0015	0014	0014	0013	996
997	0013	0013	0012	0012	0011	0011	0010	0010	0010	0009	997
998	0009	0008	0008	0007	0007	0007	0006	0006	0005	0005	998
999	0004	0004	0003	0003	0003	0002	0002	0001	0001	0000	999

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Logarithmos da hora

T. Z)

0m s	0° ′ ″	Log.s	1m s	0° ′ ″	Log.s	2m s	0° ′ ″	Log.s	3m s	0° ′ ″	Log.s	4m s	1° ′ ″	Log.s	5m s	1° ′ ″	Log.s
0	0	∞	0	15	5.6235	0	30	5.0214	0	45	4.6692	0	0	4.4193	0	15	4.2255
1	15	9.1798	1	15	5.6091	1	15	5.0142	1	15	4.6644	1	15	4.4157	1	15	4.2226
2	30	8.5777	2	30	5.5950	2	30	5.0070	2	30	4.6596	2	30	4.4121	2	30	4.2198
3	45	8.2255	3	45	5.5811	3	45	4.9999	3	45	4.6549	3	45	4.4086	3	45	4.2169
4	1	7.9756	4	16	5.5674	4	31	4.9929	4	46	4.6501	4	1	4.4050	4	16	4.2140
5	15	7.7818	5	15	5.5539	5	15	4.9859	5	15	4.6454	5	15	4.4014	5	15	4.2112
6	30	7.6235	6	30	5.5407	6	30	4.9790	6	30	4.6407	6	30	4.3979	6	30	4.2083
7	45	7.4896	7	45	5.5276	7	45	4.9721	7	45	4.6361	7	45	4.3944	7	45	4.2055
8	2	7.3736	8	17	5.5147	8	32	4.9653	8	47	4.6314	8	2	4.3909	8	17	4.2027
9	15	7.2713	9	15	5.5021	9	15	4.9586	9	15	4.6268	9	15	4.3874	9	15	4.1999
10	30	7.1798	10	30	5.4896	10	30	4.9519	10	30	4.6223	10	30	4.3839	10	30	4.1970
11	45	7.0970	11	45	5.4772	11	45	4.9452	11	45	4.6177	11	45	4.3804	11	45	4.1943
12	3	7.0214	12	18	5.4651	12	33	4.9386	12	48	4.6132	12	3	4.3770	12	18	4.1915
13	15	6.9519	13	15	5.4531	13	15	4.9321	13	15	4.6086	13	15	4.3735	13	15	4.1887
14	30	6.8875	14	30	5.4413	14	30	4.9255	14	30	4.6042	14	30	4.3701	14	30	4.1859
15	45	6.8276	15	45	5.4296	15	45	4.9191	15	45	4.5997	15	45	4.3667	15	45	4.1832
16	4	6.7715	16	19	5.4181	16	34	4.9127	16	49	4.5952	16	4	4.3633	16	19	4.1804
17	15	6.7189	17	15	5.4068	17	15	4.9063	17	15	4.5908	17	15	4.3599	17	15	4.1777
18	30	6.6692	18	30	5.3956	18	30	4.9000	18	30	4.5864	18	30	4.3565	18	30	4.1749
19	45	6.6222	19	45	5.3845	19	45	4.8937	19	45	4.5821	19	45	4.3532	19	45	4.1722
20	5	6.5777	20	20	5.3736	20	35	4.8875	20	50	4.5777	20	5	4.3498	20	20	4.1695
21	15	6.5353	21	15	5.3628	21	15	4.8813	21	15	4.5734	21	15	4.3465	21	15	4.1668
22	30	6.4949	22	30	5.3521	22	30	4.8752	22	30	4.5691	22	30	4.3432	22	30	4.1641
23	45	6.4563	23	45	5.3416	23	45	4.8691	23	45	4.5648	23	45	4.3399	23	45	4.1614
24	6	6.4193	24	21	5.3312	24	36	4.8630	24	51	4.5605	24	6	4.3366	24	21	4.1587
25	15	6.3839	25	15	5.3209	25	15	4.8570	25	15	4.5563	25	15	4.3333	25	15	4.1560
26	30	6.3498	26	30	5.3108	26	30	4.8511	26	30	4.5520	26	30	4.3300	26	30	4.1534
27	45	6.3170	27	45	5.3007	27	45	4.8451	27	45	4.5478	27	45	4.3267	27	45	4.1507
28	7	6.2854	28	22	5.2908	28	37	4.8392	28	52	4.5436	28	7	4.3235	28	22	4.1480
29	15	6.2550	29	15	5.2810	29	15	4.8334	29	15	4.5395	29	15	4.3203	29	15	4.1454
30	30	6.2255	30	30	5.2713	30	30	4.8276	30	30	4.5353	30	30	4.3170	30	30	4.1427
31	45	6.1970	31	45	5.2617	31	45	4.8218	31	45	4.5312	31	45	4.3138	31	45	4.1401
32	8	6.1695	32	23	5.2522	32	38	4.8161	32	53	4.5271	32	8	4.3106	32	23	4.1375
33	15	6.1427	33	15	5.2428	33	15	4.8104	33	15	4.5230	33	15	4.3074	33	15	4.1349
34	30	6.1168	34	30	5.2335	34	30	4.8047	34	30	4.5189	34	30	4.3043	34	30	4.1323
35	45	6.0916	35	45	5.2243	35	45	4.7991	35	45	4.5149	35	45	4.3011	35	45	4.1297
36	9	6.0671	36	24	5.2152	36	39	4.7935	36	54	4.5109	36	9	4.2979	36	24	4.1271
37	15	6.0433	37	15	5.2062	37	15	4.7880	37	15	4.5068	37	15	4.2948	37	15	4.1245
38	30	6.0202	38	30	5.1973	38	30	4.7824	38	30	4.5028	38	30	4.2917	38	30	4.1219
39	45	5.9976	39	45	5.1885	39	45	4.7770	39	45	4.4989	39	45	4.2886	39	45	4.1194
40	10	5.9756	40	25	5.1798	40	40	4.7715	40	55	4.4949	40	10	4.2855	40	25	4.1168
41	15	5.9542	41	15	5.1711	41	15	4.7661	41	15	4.4910	41	15	4.2824	41	15	4.1143
42	30	5.9333	42	30	5.1626	42	30	4.7607	42	30	4.4871	42	30	4.2793	42	30	4.1117
43	45	5.9128	43	45	5.1541	43	45	4.7554	43	45	4.4832	43	45	4.2762	43	45	4.1092
44	11	5.8928	44	26	5.1457	44	41	4.7501	44	56	4.4793	44	11	4.2731	44	26	4.1067
45	15	5.8733	45	15	5.1374	45	15	4.7448	45	15	4.4754	45	15	4.2701	45	15	4.1041
46	30	5.8542	46	30	5.1291	46	30	4.7395	46	30	4.4715	46	30	4.2670	46	30	4.1016
47	45	5.8356	47	45	5.1210	47	45	4.7343	47	45	4.4677	47	45	4.2640	47	45	4.0991
48	12	5.8173	48	27	5.1120	48	42	4.7291	48	57	4.4639	48	12	4.2610	48	27	4.0966
49	15	5.7994	49	15	5.1049	49	15	4.7240	49	15	4.4601	49	15	4.2580	49	15	4.0941
50	30	5.7818	50	30	5.0970	50	30	4.7189	50	30	4.4563	50	30	4.2550	50	30	4.0916
51	45	5.7646	51	45	5.0891	51	45	4.7138	51	45	4.4525	51	45	4.2520	51	45	4.0892
52	13	5.7477	52	28	5.0813	52	43	4.7087	52	58	4.4488	52	13	4.2490	52	28	4.0867
53	15	5.7312	53	15	5.0736	53	15	4.7037	53	15	4.4451	53	15	4.2460	53	15	4.0842
54	30	5.7150	54	30	5.0659	54	30	4.6987	54	30	4.4413	54	30	4.2431	54	30	4.0818
55	45	5.6990	55	45	5.0584	55	45	4.6937	55	45	4.4376	55	45	4.2401	55	45	4.0793
56	14	5.6834	56	29	5.0508	56	44	4.6887	56	59	4.4339	56	14	4.2372	56	29	4.0769
57	15	5.6680	57	15	5.0434	57	15	4.6838	57	15	4.4303	57	15	4.2343	57	15	4.0744
58	30	5.6529	58	30	5.0360	58	30	4.6789	58	30	4.4266	58	30	4.2313	58	30	4.0720
59	45	5.6380	59	45	5.0287	59	45	4.6740	59	45	4.4230	59	45	4.2284	59	45	4.0696

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6ᵐ s	1° ′ ″	Log.ˢ	7ᵐ s	1° ′ ″	Log.ˢ	8ᵐ s	2° ′ ″	Log.ˢ	9ᵐ s	2° ′ ″	Log.ˢ	10ᵐ s	2° ′ ″	Log.ˢ	11ᵐ s	2° ′ ″	Log.ˢ
0	**30**	4.0672	0	**45**	3.9333	0	**0**	3.8153	0	**15**	3.7150	0	**30**	3.6235	0	**45**	3.5407
1	15	48	1	15	12	1	15	75	1	15	34	1	15	21	1	15	3.5394
2	30	24	2	30	3.9292	2	30	37	2	30	18	2	30	06	2	30	81
3	45	00	3	45	71	3	45	19	3	45	02	3	45	3.6192	3	45	68
4	**31**	4.0576	4	**46**	51	4	**1**	01	4	**16**	3.7086	4	**31**	77	4	**46**	55
5	15	52	5	15	30	5	15	3.8083	5	15	70	5	15	63	5	15	42
6	30	28	6	30	10	6	30	65	6	30	54	6	30	49	6	30	29
7	45	04	7	45	3.9189	7	45	47	7	45	38	7	45	34	7	45	16
8	**32**	4.0481	8	**47**	69	8	**2**	30	8	**17**	22	8	**32**	20	8	**47**	03
9	15	57	9	15	49	9	15	12	9	15	07	9	15	06	9	15	3.5290
10	30	34	10	30	29	10	30	3.7994	10	30	3.6991	10	30	3.6092	10	30	77
11	45	10	11	45	08	11	45	76	11	45	75	11	45	77	11	45	64
12	**33**	4.0387	12	**48**	3.9088	12	**3**	59	12	**18**	59	12	**33**	63	12	**48**	51
13	15	64	13	15	68	13	15	41	13	15	44	13	15	49	13	15	38
14	30	40	14	30	48	14	30	23	14	30	28	14	30	35	14	30	25
15	45	17	15	45	28	15	45	06	15	45	12	15	45	21	15	45	12
16	**34**	4.0294	16	**49**	08	16	**4**	3.7888	16	**19**	3.6897	16	**34**	07	16	**49**	3.5199
17	15	71	17	15	3.8988	17	15	71	17	15	81	17	15	3.5993	17	15	87
18	30	48	18	30	68	18	30	53	18	30	65	18	30	78	18	30	74
19	45	25	19	45	49	19	45	36	19	45	50	19	45	64	19	45	61
20	**35**	02	20	**50**	29	20	**5**	19	20	**20**	34	20	**35**	50	20	**50**	48
21	15	4.0179	21	15	09	21	15	01	21	15	19	21	15	36	21	15	35
22	30	57	22	30	3.8889	22	30	3.7784	22	30	03	22	30	22	22	30	23
23	45	34	23	45	70	23	45	67	23	45	3.6788	23	45	09	23	45	10
24	**36**	11	24	**51**	50	24	**6**	49	24	**21**	73	24	**36**	3.5895	24	**51**	3.5097
25	15	4.0089	25	15	31	25	15	32	25	15	57	25	15	81	25	15	85
26	30	66	26	30	11	26	30	15	26	30	42	26	30	67	26	30	72
27	45	44	27	45	3.8792	27	45	3.7698	27	45	26	27	45	53	27	45	59
28	**37**	21	28	**52**	72	28	**7**	81	28	**22**	11	28	**37**	39	28	**52**	47
29	15	3.9999	29	15	53	29	15	64	29	15	3.6696	29	15	25	29	15	34
30	30	3.9977	30	30	3.8734	30	30	3.7647	30	30	3.6681	30	30	3.5811	30	30	21
31	45	54	31	45	14	31	45	30	31	45	65	31	45	08	31	45	09
32	**38**	32	32	**53**	3.8695	32	**8**	13	32	**23**	50	32	**38**	3.5784	32	**53**	3.4996
33	15	10	33	15	76	33	15	3.7596	33	15	35	33	15	70	33	15	84
34	30	3.9888	34	30	57	34	30	79	34	30	20	34	30	57	34	30	71
35	45	66	35	45	38	35	45	62	35	45	05	35	45	43	35	45	59
36	**39**	44	36	**54**	19	36	**9**	45	36	**24**	3.6590	36	**39**	29	36	**54**	46
37	15	22	37	15	00	37	15	28	37	15	75	37	15	16	37	15	34
38	30	00	38	30	3.8581	38	30	11	38	30	60	38	30	02	38	30	21
39	45	3.9778	39	45	62	39	45	3.7495	39	45	45	39	45	3.5688	39	45	09
40	**40**	57	40	**55**	43	40	**10**	78	40	**25**	30	40	**40**	75	40	**55**	3.4897
41	15	35	41	15	24	41	15	61	41	15	15	41	15	61	41	15	84
42	30	13	42	30	05	42	30	45	42	30	00	42	30	48	42	30	72
43	45	3.9692	43	45	3.8486	43	45	28	43	45	3.6485	43	45	34	43	45	59
44	**41**	70	44	**56**	68	44	**11**	11	44	**26**	70	44	**41**	21	44	**56**	47
45	15	49	45	15	49	45	15	3.7395	45	15	55	45	15	07	45	15	35
46	30	27	46	30	30	46	30	78	46	30	40	46	30	3.5594	46	30	22
47	45	06	47	45	12	47	45	62	47	45	25	47	45	80	47	45	10
48	**42**	3.9585	48	**57**	3.8393	48	**12**	46	48	**27**	11	48	**42**	67	48	**57**	3.4798
49	15	63	49	15	74	49	15	29	49	15	3.6396	49	15	53	49	15	86
50	30	42	50	30	56	50	30	13	50	30	81	50	30	40	50	30	73
51	45	21	51	45	38	51	45	3.7296	51	45	66	51	45	27	51	45	61
52	**43**	00	52	**58**	19	52	**13**	80	52	**28**	52	52	**43**	13	52	**58**	49
53	15	3.9479	53	15	01	53	15	64	53	15	37	53	15	00	53	15	37
54	30	58	54	30	3.8282	54	30	47	54	30	22	54	30	3.5497	54	30	25
55	45	37	55	45	64	55	45	31	55	45	08	55	45	74	55	45	12
56	**44**	16	56	**59**	46	56	**14**	15	56	**29**	3.6293	56	**44**	60	56	**59**	00
57	15	3.9395	57	15	28	57	15	3.7199	57	15	79	57	15	47	57	15	3.4688
58	30	74	58	30	09	58	30	82	58	30	64	58	30	34	58	30	76
59	45	54	59	45	3.8191	59	45	66	59	45	50	59	45	21	59	45	64

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12ᵐ s	3° ′ ″	Log.ᵗ	13ᵐ s	3° ′ ″	Log.ᵗ	14ᵐ s	3° ′ ″	Log.ᵗ	15ᵐ s	3° ′ ″	Log.ᵗ	16ᵐ s	4° ′ ″	Log.ᵗ	17ᵐ s	4° ′ ″	Log.ᵗ
0	0	3.4652	0	15	3.3957	0	30	3.3313	0	45	3.2714	0	0	3.2154	0	15	3.1628
1	15	40	1	15	46	1	15	03	1	15	05	1	15	45	1	15	19
2	30	28	2	30	35	2	30	3.3293	2	30	3.2695	2	30	36	2	30	11
3	45	16	3	45	23	3	45	82	3	45	85	3	45	27	3	45	02
4	1	04	4	16	12	4	31	72	4	46	76	4	1	18	4	16	3.1504
5	15	3.4592	5	15	01	5	15	62	5	15	66	5	15	09	5	15	85
6	30	80	6	30	3.3890	6	30	51	6	30	57	6	30	00	6	30	77
7	45	68	7	45	79	7	45	41	7	45	47	7	45	3.2091	7	45	68
8	2	56	8	17	68	8	32	31	8	47	37	8	2	82	8	17	60
9	15	44	9	15	57	9	15	21	9	15	28	9	15	73	9	15	51
10	30	32	10	30	46	10	30	11	10	30	18	10	30	64	10	30	43
11	45	20	11	45	35	11	45	00	11	45	09	11	45	55	11	45	34
12	3	08	12	18	24	12	33	3.3190	12	48	3.2599	12	3	46	12	18	26
13	15	3.4496	13	15	13	13	15	80	13	15	90	13	15	37	13	15	18
14	30	85	14	30	02	14	30	70	14	30	80	14	30	28	14	30	09
15	45	73	15	45	3.3791	15	45	50	15	45	71	15	45	19	15	45	01
16	4	61	16	19	80	16	34	49	16	49	61	16	4	10	16	19	3.1492
17	15	49	17	15	70	17	15	39	17	15	52	17	15	01	17	15	84
18	30	37	18	30	59	18	30	29	18	30	42	18	30	3.1993	18	30	76
19	45	26	19	45	48	19	45	19	19	45	33	19	45	84	19	45	67
20	5	14	20	20	37	20	35	09	20	50	23	20	5	75	20	20	59
21	15	02	21	15	26	21	15	3.3099	21	15	14	21	15	66	21	15	51
22	30	3.4391	22	30	15	22	30	89	22	30	05	22	30	57	22	30	42
23	45	79	23	45	04	23	45	79	23	45	3.2495	23	45	48	23	45	34
24	6	67	24	21	3.3694	24	36	69	24	51	86	24	6	39	24	21	26
25	15	55	25	15	83	25	15	59	25	15	76	25	15	31	25	15	17
26	30	44	26	30	72	26	30	49	26	30	67	26	30	22	26	30	09
27	45	32	27	45	61	27	45	39	27	45	58	27	45	13	27	45	01
28	7	21	28	22	51	28	37	29	28	52	48	28	7	04	28	22	3.1392
29	15	09	29	15	40	29	15	19	29	15	39	29	15	3.1895	29	15	84
30	30	3.4297	30	30	3.3629	30	30	3.3009	30	30	3.2430	30	30	3.1887	30	30	3.1376
31	45	86	31	45	18	31	45	3.2999	31	45	20	31	45	78	31	45	68
32	8	74	32	23	08	32	38	89	32	53	11	32	8	69	32	23	59
33	15	63	33	15	3.3597	33	15	79	33	15	02	33	15	60	33	15	51
34	30	51	34	30	86	34	30	69	34	30	3.2392	34	30	52	34	30	43
35	45	40	35	45	76	35	45	59	35	45	83	35	45	43	35	45	35
36	9	28	36	24	65	36	39	49	36	54	74	36	9	34	36	24	26
37	15	17	37	15	54	37	15	39	37	15	64	37	15	26	37	15	18
38	30	05	38	30	44	38	30	29	38	30	55	38	30	17	38	30	10
39	45	3.4194	39	45	33	39	45	19	39	45	46	39	45	08	39	45	02
40	10	82	40	25	23	40	40	09	40	55	37	40	10	3.1799	40	25	3.1294
41	15	71	41	15	12	41	15	3.2899	41	15	27	41	15	91	41	15	85
42	30	60	42	30	01	42	30	90	42	30	18	42	30	82	42	30	77
43	45	48	43	45	3.3491	43	45	80	43	45	09	43	45	73	43	45	69
44	11	37	44	26	80	44	41	70	44	56	00	44	11	65	44	26	61
45	15	25	45	15	70	45	15	60	45	15	3.2290	45	15	56	45	15	53
46	30	14	46	30	59	46	30	50	46	30	81	46	30	48	46	30	45
47	45	03	47	45	49	47	45	41	47	45	72	47	45	39	47	45	36
48	12	3.4091	48	27	38	48	42	31	48	57	63	48	12	30	48	27	28
49	15	80	49	15	28	49	15	21	49	15	54	49	15	22	49	15	20
50	30	69	50	30	17	50	30	11	50	30	45	50	30	13	50	30	12
51	45	58	51	45	07	51	45	01	51	45	36	51	45	04	51	45	04
52	13	46	52	28	3.3306	52	43	3.2792	52	58	27	52	13	3.1696	52	28	3.1196
53	15	35	53	15	86	53	15	82	53	15	17	53	15	87	53	15	88
54	30	24	54	30	76	54	30	72	54	30	08	54	30	79	54	30	80
55	45	13	55	45	65	55	45	63	55	45	3.2199	55	45	70	55	45	72
56	14	01	56	29	55	56	44	53	56	59	90	56	14	61	56	29	63
57	15	3.3990	57	15	44	57	15	43	57	15	81	57	15	53	57	15	55
58	30	79	58	30	34	58	30	34	58	30	72	58	30	45	58	30	47
59	45	68	59	45	24	59	45	24	59	45	63	59	45	36	59	45	39

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18ᵐ s	4° ′ ″	Log.ˢ	19ᵐ s	4° ′ ″	Log.ˢ	20ᵐ s	5° ′ ″	Log.ˢ	21ᵐ s	5° ′ ″	Log.ˢ	22ᵐ s	5° ′ ″	Log.ˢ	23ᵐ s	5° ′ ″	Log.ˢ
0	30	3.1131	0	45	3.0662	0	0	3.0217	0	15	2.9793	0	30	2.9389	0	45	2.9004
1	15	23	1	15	54	1	15	09	1	15	86	1	15	83	1	15	2.8997
2	30	15	2	30	47	2	30	02	2	30	79	2	30	76	2	30	91
3	45	07	3	45	39	3	45	3.0195	3	45	73	3	45	70	3	45	85
4	31	3.1099	4	46	32	4	1	88	4	16	66	4	31	63	4	46	78
5	15	91	5	15	24	5	15	81	5	15	59	5	15	57	5	15	72
6	30	83	6	30	16	6	30	73	6	30	52	6	30	50	6	30	66
7	45	75	7	45	09	7	45	66	7	45	45	7	45	43	7	45	60
8	32	67	8	47	01	8	2	59	8	17	38	8	32	37	8	47	53
9	15	59	9	15	3.0594	9	15	52	9	15	31	9	15	30	9	15	47
10	30	51	10	30	86	10	30	45	10	30	25	10	30	24	10	30	41
11	45	43	11	45	79	11	45	37	11	45	18	11	45	17	11	45	35
12	33	35	12	48	71	12	3	30	12	18	11	12	33	11	12	48	28
13	15	27	13	15	63	13	15	23	13	15	04	13	15	04	13	15	22
14	30	19	14	30	56	14	30	16	14	30	2.9697	14	30	2.9298	14	30	16
15	45	12	15	45	48	15	45	09	15	45	90	15	45	91	15	45	10
16	34	04	16	49	41	16	4	02	16	19	84	16	34	85	16	49	04
17	15	3.0996	17	15	33	17	15	3.0095	17	15	77	17	15	78	17	15	2.8897
18	30	88	18	30	26	18	30	87	18	30	70	18	30	72	18	30	91
19	45	80	19	45	18	19	45	80	19	45	63	19	45	65	19	45	85
20	35	72	20	50	11	20	5	73	20	20	56	20	35	59	20	50	79
21	15	64	21	15	03	21	15	66	21	15	50	21	15	52	21	15	73
22	30	56	22	30	3.0496	22	30	59	22	30	43	22	30	46	22	30	66
23	45	48	23	45	89	23	45	52	23	45	36	23	45	39	23	45	60
24	36	40	24	51	81	24	6	45	24	21	29	24	36	33	24	51	54
25	15	33	25	15	74	25	15	38	25	15	23	25	15	27	25	15	48
26	30	25	26	30	66	26	30	31	26	30	16	26	30	20	26	30	42
27	45	17	27	45	59	27	45	24	27	45	09	27	45	14	27	45	35
28	37	09	28	52	51	28	7	16	28	22	02	28	37	07	28	52	29
29	15	01	29	15	44	29	15	09	29	15	2.9596	29	15	01	29	15	23
30	30	3.0893	30	30	3.0436	30	30	3.0002	30	30	2.9589	30	30	2.9104	30	30	2.8817
31	45	86	31	45	29	31	45	2.9995	31	45	82	31	45	88	31	45	11
32	38	78	32	53	22	32	8	88	32	23	75	32	38	81	32	53	05
33	15	70	33	15	14	33	15	81	33	15	69	33	15	75	33	15	2.8799
34	30	62	34	30	07	34	30	74	34	30	62	34	30	69	34	30	92
35	45	54	35	45	3.0399	35	45	67	35	45	55	35	45	62	35	45	86
36	39	47	36	54	92	36	9	60	36	24	49	36	39	56	36	54	80
37	15	39	37	15	85	37	15	53	37	15	42	37	15	49	37	15	74
38	30	31	38	30	77	38	30	46	38	30	35	38	30	43	38	30	68
39	45	23	39	45	70	39	45	39	39	45	29	39	45	37	39	45	62
40	40	16	40	55	63	40	10	32	40	25	22	40	40	30	40	55	56
41	15	08	41	15	55	41	15	25	41	15	15	41	15	24	41	15	50
42	30	00	42	30	48	42	30	18	42	30	09	42	30	18	42	30	43
43	45	3.0792	43	45	41	43	45	11	43	45	02	43	45	11	43	45	37
44	41	85	44	56	33	44	11	04	44	26	2.9495	44	41	05	44	56	31
45	15	77	45	15	26	45	15	2.9897	45	15	89	45	15	2.9098	45	15	25
46	30	69	46	30	19	46	30	90	46	30	82	46	30	92	46	30	19
47	45	61	47	45	11	47	45	83	47	45	75	47	45	86	47	45	13
48	42	54	48	57	04	48	12	76	48	27	69	48	42	79	48	57	07
49	15	46	49	15	3.0297	49	15	69	49	15	62	49	15	73	49	15	01
50	30	38	50	30	89	50	30	62	50	30	55	50	30	67	50	30	2.8695
51	45	31	51	45	82	51	45	55	51	45	49	51	45	60	51	45	89
52	43	23	52	58	75	52	13	48	52	28	42	52	43	54	52	58	83
53	15	15	53	15	67	53	15	42	53	15	36	53	15	48	53	15	77
54	30	08	54	30	60	54	30	35	54	30	29	54	30	41	54	30	70
55	45	00	55	45	53	55	45	28	55	45	22	55	45	35	55	45	64
56	44	3.0692	56	59	46	56	14	21	56	29	16	56	44	29	56	59	58
57	15	85	57	15	38	57	15	14	57	15	09	57	15	22	57	15	52
58	30	77	58	30	31	58	30	07	58	30	03	58	30	16	58	30	46
59	45	70	59	45	24	59	45	00	59	45	2.9396	59	45	10	59	45	40

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T. Z)

24m s	6° ′ ″	Log.s	25m s	6° ′ ″	Log.s	26m s	6° ′ ″	Log.s	27m s	6° ′ ″	Log.s	28m s	7° ′ ″	Log.s	29m s	7° ′ ″	Log.s
0	0	2.8634	0	15	2.8280	0	30	2.7940	0	45	2.7612	0	0	2.7297	0	15	2.6992
1	15	28	1	15	74	1	15	34	1	15	07	1	15	92	1	15	87
2	30	22	2	30	68	2	30	29	2	30	02	2	30	86	2	30	82
3	45	16	3	45	63	3	45	23	3	45	2.7596	3	45	81	3	45	77
4	1	10	4	16	57	4	31	17	4	46	91	4	1	76	4	16	72
5	15	04	5	15	51	5	15	12	5	15	86	5	15	71	5	15	67
6	30	2.8598	6	30	45	6	30	06	6	30	80	6	30	66	6	30	62
7	45	92	7	45	40	7	45	01	7	45	75	7	45	61	7	45	58
8	2	86	8	17	34	8	32	2.7895	8	47	70	8	2	56	8	17	53
9	15	80	9	15	28	9	15	90	9	15	64	9	15	50	9	15	48
10	30	74	10	30	22	10	30	84	10	30	59	10	30	45	10	30	43
11	45	68	11	45	17	11	45	79	11	45	54	11	45	40	11	45	38
12	3	62	12	18	11	12	33	73	12	48	48	12	3	35	12	18	33
13	15	56	13	15	05	13	15	68	13	15	43	13	15	30	13	15	28
14	30	50	14	30	2.8199	14	30	62	14	30	38	14	30	25	14	30	23
15	45	44	15	45	94	15	45	57	15	45	32	15	45	20	15	45	18
16	4	38	16	19	88	16	34	51	16	49	27	16	4	15	16	19	13
17	15	32	17	15	82	17	15	46	17	15	22	17	15	09	17	15	08
18	30	26	18	30	77	18	30	40	18	30	16	18	30	04	18	30	03
19	45	20	19	45	71	19	45	35	19	45	11	19	45	2.7199	19	45	2.6898
20	5	15	20	20	65	20	35	29	20	50	06	20	5	94	20	20	93
21	15	09	21	15	59	21	15	24	21	15	01	21	15	89	21	15	88
22	30	03	22	30	54	22	30	18	22	30	2.7495	22	30	84	22	30	83
23	45	2.8497	23	45	48	23	45	13	23	45	90	23	45	79	23	45	78
24	6	91	24	21	42	24	36	07	24	51	85	24	6	74	24	21	74
25	15	85	25	15	37	25	15	02	25	15	79	25	15	69	25	15	69
26	30	79	26	30	31	26	30	2.7796	26	30	74	26	30	64	26	30	64
27	45	73	27	45	25	27	45	91	27	45	69	27	45	58	27	45	59
28	7	67	28	22	20	28	37	85	28	52	64	28	7	53	28	22	54
29	15	61	29	15	14	29	15	80	29	15	58	29	15	48	29	15	49
30	30	2.8455	30	30	2.8108	30	30	2.7774	30	30	2.7453	30	30	2.7143	30	30	2.6844
31	45	49	31	45	03	31	45	69	31	45	48	31	45	38	31	45	39
32	8	44	32	23	2.8097	32	38	64	32	53	43	32	8	33	32	23	34
33	15	38	33	15	91	33	15	58	33	15	37	33	15	28	33	15	29
34	30	32	34	30	86	34	30	53	34	30	32	34	30	23	34	30	24
35	45	26	35	45	80	35	45	47	35	45	27	35	45	18	35	45	20
36	9	20	36	24	74	36	39	42	36	54	22	36	9	13	36	24	15
37	15	14	37	15	69	37	15	36	37	15	16	37	15	08	37	15	10
38	30	08	38	30	63	38	30	31	38	30	11	38	30	03	38	30	05
39	45	02	39	45	57	39	45	25	39	45	06	39	45	2.7098	39	45	00
40	10	2.8396	40	25	52	40	40	20	40	55	01	40	10	93	40	25	2.6795
41	15	91	41	15	46	41	15	15	41	15	2.7395	41	15	88	41	15	90
42	30	85	42	30	40	42	30	09	42	30	90	42	30	83	42	30	85
43	45	79	43	45	35	43	45	04	43	45	85	43	45	78	43	45	81
44	11	73	44	26	29	44	41	2.7698	44	56	80	44	11	72	44	26	76
45	15	67	45	15	24	45	15	93	45	15	75	45	15	67	45	15	71
46	30	61	46	30	18	46	30	88	46	30	69	46	30	62	46	30	66
47	45	56	47	45	12	47	45	82	47	45	64	47	45	57	47	45	61
48	12	50	48	27	07	48	42	77	48	57	59	48	12	52	48	27	56
49	15	44	49	15	01	49	15	71	49	15	54	49	15	47	49	15	51
50	30	38	50	30	2.7995	50	30	66	50	30	49	50	30	42	50	30	47
51	45	32	51	45	90	51	45	61	51	45	43	51	45	37	51	45	42
52	13	26	52	28	84	52	43	55	52	58	38	52	13	32	52	28	37
53	15	21	53	15	79	53	15	50	53	15	33	53	15	27	53	15	32
54	30	15	54	30	73	54	30	44	54	30	28	54	30	22	54	30	27
55	45	09	55	45	68	55	45	39	55	45	23	55	45	17	55	45	22
56	14	03	56	29	62	56	44	34	56	59	17	56	14	12	56	29	18
57	15	23297	57	15	56	57	15	28	57	15	12	57	15	07	57	15	13
58	30	92	58	30	51	58	30	23	58	30	07	58	30	02	58	30	08
59	45	86	59	45	45	59	45	18	59	45	02	59	45	2.6997	59	45	03

Logarithmos da hora

T. Z)

30m s	7° ′ ″	Log.t	31m s	7° ′ ″	Log.t	32m s	8° ′ ″	Log.t	33m s	8° ′ ″	Log.t	34m s	8° ′ ″	Log.t	35m s	8° ′ ″	Log.t
0	30	2.6698	0	45	2.6414	0	0	2.6139	0	15	2.5872	0	30	2.5613	0	45	2.5362
1	15	93	1	15	09	1	15	34	1	15	67	1	15	09	1	15	57
2	30	89	2	30	05	2	30	30	2	30	63	2	30	04	2	30	53
3	45	84	3	45	00	3	45	25	3	45	59	3	45	00	3	45	49
4	31	79	4	46	2.6395	4	1	21	4	16	54	4	31	2.5596	4	46	45
5	15	74	5	15	91	5	15	16	5	15	50	5	15	92	5	15	41
6	30	69	6	30	86	6	30	12	6	30	45	6	30	87	6	30	37
7	45	65	7	45	81	7	45	07	7	45	41	7	45	83	7	45	33
8	32	60	8	47	77	8	2	03	8	17	37	8	32	79	8	47	29
9	15	55	9	15	72	9	15	2.6098	9	15	32	9	15	75	9	15	25
10	30	50	10	30	67	10	30	94	10	30	28	10	30	70	10	30	20
11	45	45	11	45	63	11	45	89	11	45	24	11	45	66	11	45	16
12	33	41	12	48	58	12	3	85	12	18	19	12	33	62	12	48	12
13	15	36	13	15	53	13	15	80	13	15	15	13	15	58	13	15	08
14	30	31	14	30	49	14	30	76	14	30	11	14	30	54	14	30	04
15	45	26	15	45	44	15	45	71	15	45	06	15	45	49	15	45	00
16	34	22	16	49	40	16	4	67	16	19	02	16	34	45	16	49	2.5296
17	15	17	17	15	35	17	15	62	17	15	2.5798	17	15	41	17	15	92
18	30	12	18	30	30	18	30	58	18	30	93	18	30	37	18	30	88
19	45	07	19	45	26	19	45	53	19	45	89	19	45	33	19	45	84
20	35	02	20	50	21	20	5	49	20	20	85	20	35	28	20	50	79
21	15	2.6598	21	15	17	21	15	44	21	15	80	21	15	24	21	15	75
22	30	93	22	30	12	22	30	40	22	30	76	22	30	20	22	30	71
23	45	88	23	45	07	23	45	35	23	45	72	23	45	16	23	45	67
24	36	83	24	51	03	24	6	31	24	21	67	24	36	11	24	51	63
25	15	79	25	15	2.6298	25	15	26	25	15	63	25	15	07	25	15	59
26	30	74	26	30	94	26	30	22	26	30	59	26	30	03	26	30	55
27	45	69	27	45	89	27	45	17	27	45	54	27	45	2.5499	27	45	51
28	37	64	28	52	84	28	7	13	28	22	50	28	37	95	28	52	47
29	15	60	29	15	80	29	15	09	29	15	46	29	15	91	29	15	43
30	30	2.6555	30	30	2.6275	30	30	2.6004	30	30	2.5741	30	30	2.5486	30	30	2.5239
31	45	50	31	45	71	31	45	00	31	45	37	31	45	82	31	45	35
32	38	45	32	53	66	32	8	2.5995	32	23	33	32	38	78	32	53	30
33	15	41	33	15	61	33	15	91	33	15	28	33	15	74	33	15	26
34	30	36	34	30	57	34	30	86	34	30	24	34	30	70	34	30	22
35	45	31	35	45	52	35	45	82	35	45	20	35	45	65	35	45	18
36	39	27	36	54	48	36	9	77	36	24	15	36	39	61	36	54	14
37	15	22	37	15	43	37	15	73	37	15	11	37	15	57	37	15	10
38	30	17	38	30	38	38	30	69	38	30	07	38	30	53	38	30	06
39	45	12	39	45	34	39	45	64	39	45	03	39	45	49	39	45	02
40	40	08	40	55	29	40	10	60	40	25	2.5698	40	40	45	40	55	2.5198
41	15	03	41	15	25	41	15	55	41	15	94	41	15	40	41	15	94
42	30	2.6498	42	30	20	42	30	51	42	30	90	42	30	36	42	30	90
43	45	94	43	45	16	43	45	46	43	45	85	43	45	32	43	45	86
44	41	89	44	56	11	44	11	42	44	26	81	44	41	28	44	56	82
45	15	84	45	15	07	45	15	38	45	15	77	45	15	24	45	15	78
46	30	79	46	30	02	46	30	33	46	30	73	46	30	20	46	30	74
47	45	75	47	45	2.6197	47	45	29	47	45	68	47	45	15	47	45	70
48	42	70	48	57	93	48	12	24	48	27	64	48	42	11	48	57	66
49	15	65	49	15	88	49	15	20	49	15	60	49	15	07	49	15	62
50	30	61	50	30	84	50	30	16	50	30	55	50	30	03	50	30	58
51	45	56	51	45	79	51	45	11	51	45	51	51	45	2.5399	51	45	54
52	43	51	52	58	75	52	13	07	52	28	47	52	43	95	52	58	50
53	15	47	53	15	70	53	15	02	53	15	43	53	15	91	53	5	46
54	30	42	54	30	66	54	30	2.5898	54	30	38	54	30	86	54	10	41
55	45	37	55	45	61	55	45	94	55	45	34	55	45	82	55	15	37
56	44	33	56	59	57	56	14	89	56	29	30	56	44	78	56	19	33
57	15	28	57	15	52	57	15	85	57	15	26	57	15	74	57	15	29
58	30	23	58	30	48	58	30	80	58	30	21	58	30	70	58	30	25
59	45	19	59	45	43	59	45	76	59	45	17	59	45	66	59	45	21

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36m s	9° ′ ″	Log.s	37m s	9° ′ ″	Log.s	38m s	9° ′ ″	Log.s	39m s	9° ′ ″	Log.s	40m s	10° ′ ″	Log.s	41m s	10° ′ ″	Log.s
0	0	2.5117	0	15	2.4880	0	30	2.4649	0	45	2.4424	0	0	2.4204	0	15	2.3990
1	15	13	1	15	76	1	15	45	1	15	20	1	15	01	1	15	87
2	30	09	2	30	72	2	30	41	2	30	16	2	30	2.4197	2	30	83
3	45	05	3	45	68	3	45	37	3	45	13	3	45	94	3	45	80
4	1	01	4	16	64	4	31	34	4	46	09	4	1	90	4	16	76
5	15	2.5097	5	15	60	5	15	30	5	15	05	5	15	86	5	15	73
6	30	93	6	30	57	6	30	26	6	30	02	6	30	83	6	30	69
7	45	89	7	45	53	7	45	22	7	45	2.4398	7	45	79	7	45	66
8	2	85	8	17	49	8	32	18	8	47	94	8	2	75	8	17	62
9	15	81	9	15	45	9	15	15	9	15	90	9	15	72	9	15	59
10	30	77	10	30	41	10	30	11	10	30	87	10	30	68	10	30	55
11	45	73	11	45	37	11	45	07	11	45	83	11	45	65	11	45	52
12	3	69	12	18	33	12	33	03	12	48	79	12	3	61	12	18	48
13	15	65	13	15	29	13	15	00	13	15	76	13	15	58	13	15	45
14	30	61	14	30	25	14	30	2.4596	14	30	72	14	30	54	14	30	41
15	45	57	15	45	22	15	45	92	15	45	68	15	45	50	15	45	38
16	4	53	16	19	18	16	34	88	16	49	65	16	4	47	16	19	34
17	15	49	17	15	14	17	15	84	17	15	61	17	15	43	17	15	31
18	30	45	18	30	10	18	30	81	18	30	57	18	30	40	18	30	27
19	45	41	19	45	06	19	45	77	19	45	54	19	45	36	19	45	24
20	5	37	20	20	02	20	35	73	20	50	50	20	5	32	20	20	20
21	15	34	21	15	2.4798	21	15	69	21	15	46	21	15	29	21	15	17
22	30	30	22	30	94	22	30	66	22	30	43	22	30	25	22	30	13
23	45	26	23	45	91	23	45	62	23	45	39	23	45	22	23	45	10
24	6	22	24	21	87	24	36	58	24	51	35	24	6	18	24	21	06
25	15	18	25	15	83	25	15	54	25	15	32	25	15	15	25	15	03
26	30	14	26	30	79	26	30	51	26	30	28	26	30	11	26	30	2.3899
27	45	10	27	45	75	27	45	47	27	45	24	27	45	07	27	45	96
28	7	06	28	22	71	28	37	43	28	52	21	28	7	04	28	22	92
29	15	02	29	15	67	29	15	39	29	15	17	29	15	00	29	15	89
30	30	2.4998	30	30	2.4764	30	30	2.4536	30	30	2.4313	30	30	2.4097	30	30	2.3885
31	45	94	31	45	60	31	45	32	31	45	10	31	45	93	31	45	82
32	8	90	32	23	56	32	38	28	32	53	06	32	8	90	32	23	78
33	15	86	33	15	52	33	15	24	33	15	02	33	15	86	33	15	75
34	30	82	34	30	48	34	30	21	34	30	2.4299	34	30	82	34	30	72
35	45	78	35	45	44	35	45	17	35	45	95	35	45	79	35	45	68
36	9	74	36	24	40	36	39	13	36	54	91	36	9	75	36	24	65
37	15	70	37	15	37	37	15	09	37	15	88	37	15	72	37	15	61
38	30	66	38	30	33	38	30	06	38	30	84	38	30	68	38	30	58
39	45	62	39	45	29	39	45	02	39	45	80	39	45	65	39	45	54
40	10	58	40	25	25	40	40	2.4498	40	55	77	40	10	61	40	25	51
41	15	54	41	15	21	41	15	94	41	15	73	41	15	58	41	15	47
42	30	50	42	30	17	42	30	91	42	30	70	42	30	54	42	30	44
43	45	47	43	45	14	43	45	87	43	45	66	43	45	50	43	45	40
44	11	43	44	26	10	44	41	83	44	56	62	44	11	47	44	26	37
45	15	39	45	15	06	45	15	79	45	15	59	45	15	43	45	15	33
46	30	35	46	30	02	46	30	76	46	30	55	46	30	40	46	30	30
47	45	31	47	45	2.4698	47	45	72	47	45	51	47	45	36	47	45	26
48	12	27	48	27	95	48	42	68	48	57	48	48	12	33	48	27	23
49	15	23	49	15	91	49	15	65	49	15	44	49	15	29	49	15	20
50	30	19	50	30	87	50	30	61	50	30	41	50	30	26	50	30	16
51	45	15	51	45	83	51	45	57	51	45	37	51	45	22	51	45	13
52	13	11	52	28	79	52	43	53	52	58	33	52	13	19	52	28	09
53	15	07	53	15	75	53	15	50	53	15	30	53	15	15	53	15	06
54	30	03	54	30	72	54	30	46	54	30	26	54	30	12	54	30	02
55	45	2.4899	55	45	68	55	45	42	55	45	22	55	45	08	55	45	2.3799
56	14	96	56	29	64	56	44	39	56	59	19	56	14	05	56	29	96
57	15	92	57	15	60	57	15	35	57	15	15	57	15	01	57	15	92
58	30	88	58	30	56	58	30	31	58	30	12	58	30	2.3997	58	30	89
59	45	84	59	45	53	59	45	27	59	45	08	59	45	94	59	45	85

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30m s	7° ′ ″	Log.s	31m s	7° ′ ″	Log.s	32m s	8° ′ ″	Log.s	33m s	8° ′ ″	Log.s	34m s	8° ′ ″	Log.s	35m s	8° ′ ″	Log.s
0	30	2.6698	0	45	2.6414	0	0	2.6139	0	15	2.5872	0	30	2.5613	0	45	2.5362
1	15	93	1	15	09	1	15	34	1	15	67	1	15	09	1	15	57
2	30	89	2	30	05	2	30	30	2	30	63	2	30	04	2	30	53
3	45	84	3	45	00	3	45	25	3	45	59	3	45	00	3	45	49
4	31	79	4	46	2.6395	4	1	21	4	16	54	4	31	2.5596	4	46	45
5	15	74	5	15	91	5	15	16	5	15	50	5	15	92	5	15	41
6	30	69	6	30	86	6	30	12	6	30	45	6	30	87	6	30	37
7	45	65	7	45	81	7	45	07	7	45	41	7	45	83	7	45	33
8	32	60	8	47	77	8	2	03	8	17	37	8	32	79	8	47	29
9	15	55	9	15	72	9	15	2.6098	9	15	32	9	15	75	9	15	25
10	30	50	10	30	67	10	30	94	10	30	28	10	30	70	10	30	20
11	45	45	11	45	63	11	45	89	11	45	24	11	45	66	11	45	16
12	33	41	12	48	58	12	3	85	12	18	19	12	33	62	12	48	12
13	15	36	13	15	53	13	15	80	13	15	15	13	15	58	13	15	08
14	30	31	14	30	49	14	30	76	14	30	11	14	30	54	14	30	04
15	45	26	15	45	44	15	45	71	15	45	06	15	45	49	15	45	00
16	34	22	16	49	40	16	4	67	16	19	02	16	34	45	16	49	2.5296
17	15	17	17	15	35	17	15	62	17	15	2.5798	17	15	41	17	15	92
18	30	12	18	30	30	18	30	58	18	30	93	18	30	37	18	30	88
19	45	07	19	45	26	19	45	53	19	45	89	19	45	33	19	45	84
20	35	02	20	50	21	20	5	49	20	20	85	20	35	28	20	50	79
21	15	2.6598	21	15	17	21	15	44	21	15	80	21	15	24	21	15	75
22	30	93	22	30	12	22	30	40	22	30	76	22	30	20	22	30	71
23	45	88	23	45	07	23	45	35	23	45	72	23	45	16	23	45	67
24	36	83	24	51	03	24	6	31	24	21	67	24	36	11	24	51	63
25	15	79	25	15	2.6298	25	15	26	25	15	63	25	15	07	25	15	59
26	30	74	26	30	94	26	30	22	26	30	59	26	30	03	26	30	55
27	45	69	27	45	89	27	45	17	27	45	54	27	45	2.5499	27	45	51
28	37	64	28	52	84	28	7	13	28	22	50	28	37	95	28	52	47
29	15	60	29	15	80	29	15	09	29	15	46	29	15	91	29	15	43
30	30	2.6555	30	30	2.6275	30	30	2.6004	30	30	2.5741	30	30	2.5486	30	30	2.5239
31	45	50	31	45	71	31	45	00	31	45	37	31	45	82	31	45	35
32	38	45	32	53	66	32	8	2.5995	32	23	33	32	38	78	32	53	30
33	15	41	33	15	61	33	15	91	33	15	28	33	15	74	33	15	26
34	30	36	34	30	57	34	30	86	34	30	24	34	30	70	34	30	22
35	45	31	35	45	52	35	45	82	35	45	20	35	45	65	35	45	18
36	39	27	36	54	48	36	9	77	36	24	15	36	39	61	36	54	14
37	15	22	37	15	43	37	15	73	37	15	11	37	15	57	37	15	10
38	30	17	38	30	38	38	30	69	38	30	07	38	30	53	38	30	06
39	45	12	39	45	34	39	45	64	39	45	03	39	45	49	39	45	02
40	40	08	40	55	29	40	10	60	40	25	2.5698	40	40	45	40	55	2.5198
41	15	03	41	15	25	41	15	55	41	15	94	41	15	40	41	15	94
42	30	2.6498	42	30	20	42	30	51	42	30	90	42	30	36	42	30	90
43	45	94	43	45	16	43	45	46	43	45	85	43	45	32	43	45	86
44	41	89	44	56	11	44	11	42	44	26	81	44	41	28	44	56	82
45	15	84	45	15	07	45	15	38	45	15	77	45	15	24	45	15	78
46	30	79	46	30	02	46	30	33	46	30	73	46	30	20	46	30	74
47	45	75	47	45	2.6197	47	45	29	47	45	68	47	45	15	47	45	70
48	42	70	48	57	93	48	12	24	48	27	64	48	42	11	48	57	66
49	15	65	49	15	88	49	15	20	49	15	60	49	15	07	49	15	62
50	30	61	50	30	84	50	30	16	50	30	55	50	30	03	50	30	58
51	45	56	51	45	79	51	45	11	51	45	51	51	45	2.5399	51	45	54
52	43	51	52	58	75	52	13	07	52	28	47	52	43	95	52	58	50
53	15	47	53	15	70	53	15	02	53	15	43	53	15	91	53	15	46
54	30	42	54	30	66	54	30	2.5898	54	30	38	54	30	86	54	30	41
55	45	37	55	45	61	55	45	94	55	45	34	55	45	82	55	45	37
56	44	33	56	59	57	56	14	89	56	29	30	56	44	78	56	59	33
57	15	28	57	15	52	57	15	85	57	15	26	57	15	74	57	15	29
58	30	23	58	30	48	58	30	80	58	30	21	58	30	70	58	30	25
59	45	19	59	45	43	59	45	76	59	45	17	59	45	66	59	45	21

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36m s	9° ′ ″	Log.s	37m s	9° ′ ″	Log.s	38m s	9° ′ ″	Log.s	39m s	9° ′ ″	Log.s	40m s	10° ′ ″	Log.s	41m s	10° ′ ″	Log.s
0	0	2.5117	0	15	2.4880	0	30	2.4649	0	45	2.4424	0	0	2.4204	0	15	2.3990
1	15	13	1	15	76	1	15	45	1	15	20	1	15	01	1	15	87
2	30	09	2	30	72	2	30	41	2	30	16	2	30	2.4197	2	30	83
3	45	05	3	45	68	3	45	37	3	45	13	3	45	94	3	45	80
4	1	01	4	16	64	4	31	34	4	46	09	4	1	90	4	16	76
5	15	2.5097	5	15	60	5	15	30	5	15	05	5	15	86	5	15	73
6	30	93	6	30	57	6	30	26	6	30	02	6	30	83	6	30	69
7	45	89	7	45	53	7	45	22	7	45	2.4398	7	45	79	7	45	66
8	2	85	8	17	49	8	32	18	8	47	94	8	2	75	8	17	62
9	15	81	9	15	45	9	15	15	9	15	90	9	15	72	9	15	59
10	30	77	10	30	41	10	30	11	10	30	87	10	30	68	10	30	55
11	45	73	11	45	37	11	45	07	11	45	83	11	45	65	11	45	52
12	3	69	12	18	33	12	33	03	12	48	79	12	3	61	12	18	48
13	15	65	13	15	29	13	15	00	13	15	76	13	15	58	13	15	45
14	30	61	14	30	25	14	30	2.4596	14	30	72	14	30	54	14	30	41
15	45	57	15	45	22	15	45	92	15	45	68	15	45	50	15	45	38
16	4	53	16	19	18	16	34	88	16	49	65	16	4	47	16	19	34
17	15	49	17	15	14	17	15	84	17	15	61	17	15	43	17	15	31
18	30	45	18	30	10	18	30	81	18	30	57	18	30	40	18	30	27
19	45	41	19	45	06	19	45	77	19	45	54	19	45	36	19	45	24
20	5	37	20	20	02	20	35	73	20	50	50	20	5	32	20	20	20
21	15	34	21	15	2.4798	21	15	69	21	15	46	21	15	29	21	15	17
22	30	30	22	30	94	22	30	66	22	30	43	22	30	25	22	30	13
23	45	26	23	45	91	23	45	62	23	45	39	23	45	22	23	45	10
24	6	22	24	21	87	24	36	58	24	51	35	24	6	18	24	21	06
25	15	18	25	15	83	25	15	54	25	15	32	25	15	15	25	15	03
26	30	14	26	30	79	26	30	51	26	30	28	26	30	11	26	30	2.3899
27	45	10	27	45	75	27	45	47	27	45	24	27	45	07	27	45	96
28	7	06	28	22	71	28	37	43	28	52	21	28	7	04	28	22	92
29	15	02	29	15	67	29	15	39	29	15	17	29	15	00	29	15	89
30	30	2.4998	30	30	2.4764	30	30	2.4536	30	30	2.4313	30	30	2.4097	30	30	2.3885
31	45	94	31	45	60	31	45	32	31	45	10	31	45	93	31	45	82
32	8	90	32	23	56	32	38	28	32	53	06	32	8	90	32	23	78
33	15	86	33	15	52	33	15	24	33	15	02	33	15	86	33	15	75
34	30	82	34	30	48	34	30	21	34	30	2.4299	34	30	82	34	30	72
35	45	78	35	45	44	35	45	17	35	45	95	35	45	79	35	45	68
36	9	74	36	24	40	36	39	13	36	54	91	36	9	75	36	24	65
37	15	70	37	15	37	37	15	09	37	15	88	37	15	72	37	15	61
38	30	66	38	30	33	38	30	06	38	30	84	38	30	68	38	30	58
39	45	62	39	45	29	39	45	02	39	45	80	39	45	65	39	45	54
40	10	58	40	25	25	40	40	2.4498	40	55	77	40	10	61	40	25	51
41	15	54	41	15	21	41	15	94	41	15	73	41	15	58	41	15	47
42	30	50	42	30	17	42	30	91	42	30	70	42	30	54	42	30	44
43	45	47	43	45	14	43	45	87	43	45	66	43	45	50	43	45	40
44	11	43	44	26	10	44	41	83	44	56	62	44	11	47	44	26	37
45	15	39	45	15	06	45	15	79	45	15	59	45	15	43	45	15	33
46	30	35	46	30	02	46	30	76	46	30	55	46	30	40	46	30	30
47	45	31	47	45	2.4698	47	45	72	47	45	51	47	45	36	47	45	26
48	12	27	48	27	95	48	42	68	48	57	48	48	12	33	48	27	23
49	15	23	49	15	91	49	15	65	49	15	44	49	15	29	49	15	20
50	30	19	50	30	87	50	30	61	50	30	41	50	30	26	50	30	16
51	45	15	51	45	83	51	45	57	51	45	37	51	45	22	51	45	13
52	13	11	52	28	79	52	43	53	52	58	33	52	13	19	52	28	09
53	15	07	53	15	75	53	15	50	53	15	30	53	15	15	53	15	06
54	30	03	54	30	72	54	30	46	54	30	26	54	30	12	54	30	02
55	45	2.4899	55	45	68	55	45	42	55	45	22	55	45	08	55	45	2.3799
56	14	96	56	29	64	56	44	39	56	59	19	56	14	05	56	29	96
57	15	92	57	15	60	57	15	35	57	15	15	57	15	01	57	15	92
58	30	88	58	30	56	58	30	31	58	30	12	58	30	2.3997	58	30	89
59	45	84	59	45	53	59	45	27	59	45	08	59	45	94	59	45	85

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42m s	10° ′ ″	Log.s	43m s	10° ′ ″	Log.s	44m s	11° ′ ″	Log.s	45m s	11° ′ ″	Log.s	46m s	11° ′ ″	Log.s	47m s	11° ′ ″	Log.s
0	**30**	2.3782	0	**45**	2.3578	0	**0**	2.3379	0	**15**	2.3184	0	**30**	2.2994	0	**45**	2.2808
1	15	78	1	15	75	1	15	76	1	15	81	1	15	91	1	15	05
2	30	75	2	30	71	2	30	72	2	30	78	2	30	88	2	30	02
3	45	71	3	45	68	3	45	69	3	45	75	3	45	85	3	45	2.2799
4	**31**	68	4	**46**	64	4	**1**	66	4	**16**	71	4	**31**	81	4	**46**	96
5	15	65	5	15	61	5	15	62	5	15	68	5	15	78	5	15	92
6	30	61	6	30	58	6	30	59	6	30	65	6	30	75	6	30	89
7	45	58	7	45	54	7	45	56	7	45	62	7	45	72	7	45	86
8	**32**	54	8	**47**	51	8	**2**	53	8	**17**	59	8	**32**	69	8	**47**	83
9	15	51	9	15	48	9	15	49	9	15	55	9	15	66	9	15	80
10	30	47	10	30	44	10	30	46	10	30	52	10	30	63	10	30	77
11	45	44	11	45	41	11	45	43	11	45	49	11	45	59	11	45	74
12	**33**	41	12	**48**	38	12	**3**	40	12	**18**	46	12	**33**	56	12	**48**	71
13	15	37	13	15	34	13	15	36	13	15	43	13	15	53	13	15	68
14	30	34	14	30	31	14	30	33	14	30	39	14	30	50	14	30	65
15	45	30	15	45	28	15	45	30	15	45	36	15	45	47	15	45	62
16	**34**	27	16	**49**	24	16	**4**	26	16	**19**	33	16	**34**	44	16	**49**	59
17	15	23	17	15	21	17	15	23	17	15	30	17	15	41	17	15	56
18	30	20	18	30	18	18	30	20	18	30	27	18	30	38	18	30	53
19	45	17	19	45	14	19	45	17	19	45	23	19	45	35	19	45	50
20	**35**	13	20	**50**	11	20	**5**	13	20	**20**	20	20	**35**	31	20	**50**	47
21	15	10	21	15	08	21	15	10	21	15	17	21	15	28	21	15	44
22	30	06	22	30	04	22	30	07	22	30	14	22	30	25	22	30	41
23	45	03	23	45	01	23	45	04	23	45	11	23	45	22	23	45	37
24	**36**	00	24	**51**	2.3498	24	**6**	00	24	**21**	08	24	**36**	19	24	**51**	34
25	15	2.3696	25	15	94	25	15	2.3297	25	15	04	25	15	16	25	15	31
26	30	93	26	30	91	26	30	94	26	30	01	26	30	13	26	30	28
27	45	89	27	45	88	27	45	91	27	45	2.3098	27	45	10	27	45	25
28	**37**	86	28	**52**	84	28	**7**	87	28	**22**	95	28	**37**	07	28	**52**	22
29	15	83	29	15	81	29	15	84	29	15	92	29	15	03	29	15	19
30	30	2.3679	30	30	2.3478	30	30	2.3281	30	30	2.3089	30	30	2.2900	30	30	2.2716
31	45	76	31	45	74	31	45	78	31	45	85	31	45	2.2897	31	45	13
32	**38**	72	32	**53**	71	32	**8**	74	32	**23**	82	32	**38**	94	32	**53**	10
33	15	69	33	15	68	33	15	71	33	15	79	33	15	91	33	15	07
34	30	66	34	30	64	34	30	68	34	30	76	34	30	88	34	30	04
35	45	62	35	45	61	35	45	65	35	45	73	35	45	85	35	45	01
36	**39**	59	36	**54**	58	36	**9**	62	36	**24**	70	36	**39**	82	36	**54**	2.2698
37	15	55	37	15	55	37	15	58	37	15	66	37	15	79	37	15	95
38	30	52	38	30	51	38	30	55	38	30	63	38	30	76	38	30	92
39	45	49	39	45	48	39	45	52	39	45	60	39	45	72	39	45	89
40	**40**	45	40	**55**	45	40	**10**	49	40	**25**	57	40	**40**	69	40	**55**	86
41	15	42	41	15	41	41	15	45	41	15	54	41	15	66	41	15	83
42	30	39	42	30	38	42	30	42	42	30	51	42	30	63	42	30	80
43	45	35	43	45	35	43	45	39	43	45	47	43	45	60	43	45	77
44	**41**	32	44	**56**	31	44	**11**	36	44	**26**	44	44	**41**	57	44	**56**	74
45	15	28	45	15	28	45	15	32	45	15	41	45	15	54	45	15	71
46	30	25	46	30	25	46	30	29	46	30	38	46	30	51	46	30	68
47	45	22	47	45	22	47	45	26	47	45	35	47	45	48	47	45	65
48	**42**	18	48	**57**	18	48	**12**	23	48	**27**	32	48	**42**	45	48	**57**	62
49	15	15	49	15	15	49	15	20	49	15	29	49	15	42	49	15	59
50	30	12	50	30	12	50	30	16	50	30	25	50	30	39	50	30	56
51	45	08	51	45	08	51	45	13	51	45	22	51	45	35	51	45	53
52	**43**	05	52	**58**	05	52	**13**	10	52	**28**	19	52	**43**	32	52	**58**	50
53	15	01	53	15	02	53	15	07	53	15	16	53	15	29	53	15	47
54	30	2.3598	54	30	2.3398	54	30	03	54	30	13	54	30	26	54	30	44
55	45	95	55	45	95	55	45	00	55	45	10	55	45	23	55	45	41
56	**44**	91	56	**59**	92	56	**14**	2.3197	56	**29**	06	56	**44**	20	56	**59**	38
57	15	88	57	15	89	57	15	94	57	15	03	57	15	17	57	15	35
58	30	85	58	30	85	58	30	91	58	30	00	58	30	14	58	30	32
59	45	81	59	45	82	59	45	87	59	45	2.2997	59	45	11	59	45	29

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m s	′	48m 12°	52m 13°	56m 14°	1h 0m 15°	1h 4m 16°	1h 8m 17°	1h 12m 18°	1h 16m 19°	1h 20m 20°	′	m s	P. p.
0	0	2.2626	2.1933	2.1293	2.0696	2.0139	1.9616	1.9124	1.8658	1.8217	0	0	
4	1	14	22	82	87	30	08	16	51	10	1	4	s | 12 1 | 3 2 | 6 3 | 9
8	2	02	11	72	77	21	1.9599	08	43	03	2	8	
12	3	2.2590	00	62	68	12	91	00	35	1.8195	3	12	
16	4	78	2.1889	51	58	03	82	1.9092	28	88	4	16	
20	5	66	78	41	48	2.0094	74	84	20	81	5	20	
24	6	54	67	31	39	85	66	76	13	74	6	24	
28	7	42	56	21	29	76	57	68	05	67	7	28	
32	8	30	45	10	20	68	49	60	1.8598	60	8	32	s | 11 1 | 2.75 2 | 5.5 3 | 8.25
36	9	18	34	00	10	59	40	52	90	53	9	36	
40	10	06	23	2.1190	01	50	32	44	83	46	10	40	
44	11	2.2494	12	80	2.0591	41	24	36	75	38	11	44	
48	12	83	01	70	82	32	15	28	68	31	12	48	
52	13	71	2.1790	60	72	23	07	21	60	24	13	52	
56	14	59	79	50	63	14	1.9499	13	53	17	14	56	
1	15	47	68	39	54	05	90	05	46	10	15	1	s | 10 1 | 2.5 2 | 5.0 3 | 7.5
4	16	35	57	29	44	1.9997	82	1.8997	38	03	16	4	
8	17	24	47	19	35	88	74	89	31	1.8096	17	8	
12	18	12	36	09	25	79	65	81	23	89	18	12	
16	19	00	25	2.1099	16	70	57	73	16	82	19	16	
20	20	2.2388	14	89	07	61	49	66	08	75	20	20	
24	21	77	03	79	2.0497	52	41	58	01	68	21	24	s | 9. 1 | 2.25 2 | 4.50 3 | 6.75
28	22	65	2.1693	69	88	44	32	50	1.8494	61	22	28	
32	23	53	82	59	78	35	24	42	86	54	23	32	
36	24	42	71	49	69	26	16	34	79	47	24	36	
40	25	30	60	39	60	17	07	27	72	40	25	40	
44	26	19	50	29	50	09	1.9399	19	64	33	26	44	
48	27	07	39	19	41	00	91	11	57	26	27	48	
52	28	2.2295	28	09	32	1.9891	83	03	49	19	28	52	s | 8 1 | 2 2 | 4 3 | 6
56	29	84	17	2.0999	22	82	75	1.8895	42	12	29	56	
2	30	2.2272	2.1607	2.0989	2.0413	1.9874	1.9366	1.8888	1.8435	1.8005	30	2	
4	31	61	2.1596	79	04	65	58	80	27	1.7998	31	4	
8	32	49	85	69	2.0395	56	50	72	20	91	32	8	
12	33	38	75	59	85	48	42	64	13	84	33	12	
16	34	26	64	50	76	39	34	57	05	77	34	16	s | 7 1 | 1.75 2 | 3.50 3 | 5.25
20	35	15	54	40	67	30	25	49	1.8398	70	35	20	
24	36	03	43	30	58	22	17	41	91	63	36	24	
28	37	2.2192	32	20	48	13	09	34	83	56	37	28	
32	38	81	22	10	39	04	01	26	76	49	38	32	
36	39	69	11	00	30	1.9796	1.9293	18	69	42	39	36	
40	40	58	01	2.0890	21	87	85	10	61	35	40	40	
44	41	46	2.1490	81	12	78	77	03	54	28	41	44	s | 6 1 | 1.5 2 | 3.0 3 | 4.5
48	42	35	80	71	03	70	68	1.8795	47	21	42	48	
52	43	24	69	61	2.0293	61	60	87	40	14	43	52	
56	44	12	59	51	84	53	52	80	32	07	44	56	
3	45	01	48	41	75	44	44	72	25	00	45	3	
4	46	2.2090	38	32	66	35	36	64	18	1.7894	46	4	
8	47	78	27	22	57	27	28	57	11	87	47	8	
12	48	67	17	12	48	18	20	49	03	80	48	12	
16	49	56	06	03	39	10	12	42	1.8296	73	49	16	
20	50	45	2.1396	2.0793	30	01	04	34	89	66	50	20	
24	51	33	85	83	20	1.9693	1.9196	26	82	59	51	24	
28	52	22	75	73	11	84	88	19	74	52	52	28	
32	53	11	65	64	02	76	80	11	67	45	53	32	
36	54	00	54	54	2.0193	67	72	03	60	39	54	36	
40	55	2.1989	44	44	84	59	64	1.8696	53	32	55	40	
44	56	78	34	35	75	50	56	88	46	25	56	44	
48	57	66	23	25	66	42	48	81	38	18	57	48	
52	58	55	13	16	57	33	40	73	31	11	58	52	
56	59	44	03	06	48	25	32	66	24	04	59	56	

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Logarithmos da hora

T. Z)

42m s	10° ′ ″	Log.s	43m s	10° ′ ″	Log.s	44m s	11° ′ ″	Log.s	45m s	11° ′ ″	Log.s	46m s	11° ′ ″	Log.s	47m s	11° ′ ″	Log.s
0	30	2.3782	0	45	2.3578	0	0	2.3379	0	15	2.3184	0	30	2.2994	0	45	2.2808
1	15	78	1	15	75	1	15	76	1	15	81	1	15	91	1	15	05
2	30	75	2	30	71	2	30	72	2	30	78	2	30	88	2	30	02
3	45	71	3	45	68	3	45	69	3	45	75	3	45	85	3	45	2.2799
4	31	68	4	46	64	4	1	66	4	16	71	4	31	81	4	46	96
5	15	65	5	15	61	5	15	62	5	15	68	5	15	78	5	15	92
6	30	61	6	30	58	6	30	59	6	30	65	6	30	75	6	30	89
7	45	58	7	45	54	7	45	56	7	45	62	7	45	72	7	45	86
8	32	54	8	47	51	8	2	53	8	17	59	8	32	69	8	47	83
9	15	51	9	15	48	9	15	49	9	15	55	9	15	66	9	15	80
10	30	47	10	30	44	10	30	46	10	30	52	10	30	63	10	30	77
11	45	44	11	45	41	11	45	43	11	45	49	11	45	59	11	45	74
12	33	41	12	48	38	12	3	40	12	18	46	12	33	56	12	48	71
13	15	37	13	15	34	13	15	36	13	15	43	13	15	53	13	15	68
14	30	34	14	30	31	14	30	33	14	30	39	14	30	50	14	30	65
15	45	30	15	45	28	15	45	30	15	45	36	15	45	47	15	45	62
16	34	27	16	49	24	16	4	26	16	19	33	16	34	44	16	49	59
17	15	23	17	15	21	17	15	23	17	15	30	17	15	41	17	15	56
18	30	20	18	30	18	18	30	20	18	30	27	18	30	38	18	30	53
19	45	17	19	45	14	19	45	17	19	45	23	19	45	35	19	45	50
20	35	13	20	50	11	20	5	13	20	20	20	20	35	31	20	50	47
21	15	10	21	15	08	21	15	10	21	15	17	21	15	28	21	15	44
22	30	06	22	30	04	22	30	07	22	30	14	22	30	25	22	30	41
23	45	03	23	45	01	23	45	04	23	45	11	23	45	22	23	45	37
24	36	00	24	51	2.3498	24	6	00	24	21	08	24	36	19	24	51	34
25	15	2.3696	25	15	94	25	15	2.3297	25	15	04	25	15	16	25	15	31
26	30	93	26	30	91	26	30	94	26	30	01	26	30	13	26	30	28
27	45	89	27	45	88	27	45	91	27	45	2.3098	27	45	10	27	45	25
28	37	86	28	52	84	28	7	87	28	22	95	28	37	07	28	52	22
29	15	83	29	15	81	29	15	84	29	15	92	29	15	03	29	15	19
30	30	2.3679	30	30	2.3478	30	30	2.3281	30	30	2.3089	30	30	2.2900	30	30	2.2716
31	45	76	31	45	74	31	45	78	31	45	85	31	45	2.2897	31	45	13
32	38	72	32	53	71	32	8	74	32	23	82	32	38	94	32	53	10
33	15	69	33	15	68	33	15	71	33	15	79	33	15	91	33	15	07
34	30	66	34	30	64	34	30	68	34	30	76	34	30	88	34	30	04
35	45	62	35	45	61	35	45	65	35	45	73	35	45	85	35	45	01
36	39	59	36	54	58	36	9	62	36	24	70	36	39	82	36	54	2.2698
37	15	55	37	15	55	37	15	58	37	15	66	37	15	79	37	15	95
38	30	52	38	30	51	38	30	55	38	30	63	38	30	76	38	30	92
39	45	49	39	45	48	39	45	52	39	45	60	39	45	72	39	45	89
40	40	45	40	55	45	40	10	49	40	25	57	40	40	69	40	55	86
41	15	42	41	15	41	41	15	45	41	15	54	41	15	66	41	15	83
42	30	39	42	30	38	42	30	42	42	30	51	42	30	63	42	30	80
43	45	35	43	45	35	43	45	39	43	45	47	43	45	60	43	45	77
44	41	32	44	56	31	44	11	36	44	26	44	44	41	57	44	56	74
45	15	28	45	15	28	45	15	32	45	15	41	45	15	54	45	15	71
46	30	25	46	30	25	46	30	29	46	30	38	46	30	51	46	30	68
47	45	22	47	45	22	47	45	26	47	45	35	47	45	48	47	45	65
48	42	18	48	57	18	48	12	23	48	27	32	48	42	45	48	57	62
49	15	15	49	15	15	49	15	20	49	15	29	49	15	42	49	15	59
50	30	12	50	30	12	50	30	16	50	30	25	50	30	39	50	30	56
51	45	08	51	45	08	51	45	13	51	45	22	51	45	35	51	45	53
52	43	05	52	58	05	52	13	10	52	28	19	52	43	32	52	58	50
53	15	01	53	15	02	53	15	07	53	15	16	53	15	29	53	15	47
54	30	2.3598	54	30	2.3398	54	30	03	54	30	13	54	30	26	54	30	44
55	45	95	55	45	95	55	45	00	55	45	10	55	45	23	55	45	41
56	44	91	56	59	92	56	14	2.3197	56	29	06	56	44	20	56	59	38
57	15	88	57	15	89	57	15	94	57	15	03	57	15	17	57	15	35
58	30	85	58	30	85	58	30	91	58	30	00	58	30	14	58	30	32
59	45	81	59	45	82	59	45	87	59	45	2.2997	59	45	11	59	45	29

Logarithmos da hora

T. Z)

m s	′	48m 12°	52m 13°	56m 14°	1h 0m 15°	1h 4m 16°	1h 8m 17°	1h 12m 18°	1h 16m 19°	1h 20m 20°	′	m s	P. p.
0	0	2.2626	2.1933	2.1293	2.0696	2.0139	1.9616	1.9124	1.8658	1.8217	0	0	
4	1	14	22	82	87	30	08	16	51	10	1	4	s 12
8	2	02	11	72	77	21	1.9599	08	43	03	2	8	1 3
12	3	2.2590	00	62	68	12	91	00	35	1.8195	3	12	2 6
16	4	78	2.1889	51	58	03	82	1.9092	28	88	4	16	3 9
20	5	66	78	41	48	2.0094	74	84	20	81	5	20	
24	6	54	67	31	39	85	66	76	13	74	6	24	
28	7	42	56	21	29	76	57	68	05	67	7	28	
32	8	30	45	10	20	68	49	60	1.8598	60	8	32	s 11
36	9	18	34	00	10	59	40	52	90	53	9	36	1 2.75
40	10	06	23	2.1190	01	50	32	44	83	46	10	40	2 5.5
44	11	2.2494	12	80	2.0591	41	24	36	75	38	11	44	3 8.25
48	12	83	01	70	82	32	15	28	68	31	12	48	
52	13	71	2.1790	60	72	23	07	21	60	24	13	52	
56	14	59	79	50	63	14	1.9499	13	53	17	14	56	
1	15	47	68	39	54	05	90	05	46	10	15	1	s 10
4	16	35	57	29	44	1.9997	82	1.8997	38	03	16	4	1 2.5
8	17	24	47	19	35	88	74	89	31	1.8096	17	8	2 5.0
12	18	12	36	09	25	79	65	81	23	89	18	12	3 7.5
16	19	00	25	2.1099	16	70	57	73	16	82	19	16	
20	20	2.2388	14	89	07	61	49	66	08	75	20	20	
24	21	77	03	79	2.0497	52	41	58	01	68	21	24	s 9
28	22	65	2.1693	69	88	44	32	50	1.8494	61	22	28	1 2.25
32	23	53	82	59	78	35	24	42	86	54	23	32	2 4.50
36	24	42	71	49	69	26	16	34	79	47	24	36	3 6.75
40	25	30	60	39	60	17	07	27	72	40	25	40	
44	26	19	50	29	50	09	1.9399	19	64	33	26	44	
48	27	07	39	19	41	00	91	11	57	26	27	48	
52	28	2.2295	28	09	32	1.9891	83	03	49	19	28	52	s 8
56	29	84	17	2.0999	22	82	75	1.8895	42	12	29	56	1 2
2	30	2.2272	2.1607	2.0989	2.0413	1.9874	1.9366	1.8888	1.8435	1.8005	30	2	2 4
4	31	61	2.1596	79	04	65	58	80	27	1.7998	31	4	3 6
8	32	49	85	69	2.0395	56	50	72	20	91	32	8	
12	33	38	75	59	85	48	42	64	13	84	33	12	
16	34	26	64	50	76	39	34	57	05	77	34	16	s 7
20	35	15	54	40	67	30	25	49	1.8398	70	35	20	1 1.75
24	36	03	43	30	58	22	17	41	91	63	36	24	2 3.50
28	37	2.2192	32	20	48	13	09	34	83	56	37	28	3 5.25
32	38	81	22	10	39	04	01	26	76	49	38	32	
36	39	69	11	00	30	1.9796	1.9293	18	69	42	39	36	
40	40	58	01	2.0890	21	87	85	10	61	35	40	40	
44	41	46	2.1490	81	12	78	77	03	54	28	41	44	s 6
48	42	35	80	71	03	70	68	1.8795	47	21	42	48	1 1.5
52	43	24	69	61	2.0293	61	60	87	40	14	43	52	2 3.0
56	44	12	59	51	84	53	52	80	32	07	44	56	3 4.5
3	45	01	48	41	75	44	44	72	25	00	45	3	
4	46	2.2090	38	32	66	35	36	64	18	1.7894	46	4	
8	47	78	27	22	57	27	28	57	11	87	47	8	
12	48	67	17	12	48	18	20	49	03	80	48	12	
16	49	56	06	03	39	10	12	42	1.8296	73	49	16	
20	50	45	2.1396	2.0793	30	01	04	34	89	66	50	20	
24	51	33	85	83	20	1.9693	1.9196	26	82	59	51	24	
28	52	22	75	73	11	84	88	19	74	52	52	28	
32	53	11	65	64	02	76	80	11	67	45	53	32	
36	54	00	54	54	2.0193	67	72	03	60	39	54	36	
40	55	2.1989	44	44	84	59	64	1.8696	53	32	55	40	
44	56	78	34	35	75	50	56	88	46	25	56	44	
48	57	66	23	25	66	42	48	81	38	18	57	48	
52	58	55	13	16	57	33	40	73	31	11	58	52	
56	59	44	03	06	48	25	32	66	24	04	59	56	

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T. Z)

m s	′	1h 24m 21°	1h 28m 22°	1h 32m 23°	1h 36m 24°	1h 40m 25°	1h 44m 26°	1h 48m 27°	1h 52m 28°	1h 56m 29°	′	m s	P. p.
0	0	1.7798	1.7398	1.7017	1.6653	1.6304	1.5968	1.5647	1.5337	1.5038	0	0	
4	1	91	92	11	47	1.6298	63	41	32	33	1	4	s 7
8	2	84	85	05	41	92	58	36	27	28	2	8	1 1.75
12	3	77	79	1.6999	35	86	52	31	22	24	3	12	2 3.50
16	4	70	72	92	29	81	47	26	17	19	4	16	3 5.25
20	5	64	66	86	23	75	41	20	11	14	5	20	
24	6	57	59	80	17	69	36	15	06	09	6	24	
28	7	50	53	74	11	64	30	10	01	04	7	28	
32	8	43	46	68	05	58	25	05	1.5296	1.4999	8	32	s 6
36	9	36	40	61	1.6599	52	19	1.5599	91	94	9	36	1 1.5
40	10	30	34	55	93	47	14	94	86	90	10	40	2 3.0
44	11	23	27	49	88	41	09	89	81	85	11	44	3 4.5
48	12	16	21	43	82	35	03	84	76	80	12	48	
52	13	09	14	37	76	30	1.5898	78	71	75	13	52	
56	14	03	08	31	70	24	92	73	66	70	14	56	
1	15	1.7696	01	25	64	18	87	68	61	65	15	1	s 5
4	16	89	1.7295	18	58	13	81	63	56	60	16	4	1 1.25
8	17	83	89	12	52	07	76	58	51	56	17	8	2 2.50
12	18	76	82	06	46	01	71	52	46	51	18	12	3 3.75
16	19	69	76	00	41	1.6196	65	47	41	46	19	16	
20	20	62	69	1.6894	35	90	60	42	36	41	20	20	
24	21	56	63	88	29	85	54	37	31	36	21	24	s 4
28	22	49	56	82	23	79	49	32	26	31	22	28	1 1
32	23	42	50	76	17	73	44	26	21	27	23	32	2 2
36	24	36	44	69	11	68	38	21	16	22	24	36	3 3
40	25	29	37	63	05	62	33	16	11	17	25	40	
44	26	22	31	57	00	57	27	11	06	12	26	44	
48	27	16	25	51	1.6404	51	22	06	01	07	27	48	
52	28	09	18	45	88	45	17	01	1.5196	03	28	52	
56	29	02	12	39	82	40	11	1.5495	91	1.4898	29	56	
2	30	1.7596	1.7206	1.6833	1.6476	1.6134	1.5806	1.5490	1.5186	1.4890	30	2	
4	31	89	1.7199	27	70	29	00	85	81	88	31	4	
8	32	82	93	21	65	23	1.5795	80	76	83	32	8	
12	33	76	87	15	59	18	90	75	71	79	33	12	
16	34	69	80	09	53	12	85	70	66	74	34	16	
20	35	62	74	03	47	06	79	64	61	69	35	20	
24	36	56	68	1.6797	42	01	74	59	56	64	36	24	
28	37	49	61	91	36	1.6095	68	54	51	59	37	28	
32	38	42	55	84	30	90	63	49	46	55	38	32	
36	39	36	49	78	24	84	58	44	41	50	39	36	
40	40	29	42	72	18	79	52	39	37	45	40	40	
44	41	23	36	66	12	73	47	34	32	40	41	44	
48	42	16	30	60	07	68	42	28	27	36	42	48	
52	43	09	23	54	01	62	36	23	22	31	43	52	
56	44	03	17	48	1.6395	57	31	18	17	26	44	56	
3	45	1.7496	11	42	89	51	1.5726	1.5413	12	21	45	3	
4	46	90	05	36	84	45	21	08	07	17	46	4	
8	47	83	1.7098	30	78	40	15	03	02	12	47	8	
12	48	77	92	24	72	34	10	1.5398	1.5097	07	48	12	
16	49	70	86	18	66	29	05	93	92	02	49	16	
20	50	64	79	12	61	23	1.5699	88	87	1.4798	50	20	
24	51	57	73	06	55	18	94	82	82	93	51	24	
28	52	50	67	00	49	12	89	77	77	88	52	28	
32	53	44	61	1.6694	44	07	83	72	73	83	53	32	
36	54	37	54	88	38	01	78	67	68	79	54	36	
40	55	31	48	82	32	1.5996	73	62	63	74	55	40	
44	56	24	42	76	26	90	68	57	58	69	56	44	
48	57	18	36	71	21	85	62	52	53	64	57	48	
52	58	11	30	65	15	79	57	47	48	60	58	52	
56	59	05	23	59	09	74	52	42	43	55	59	56	

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T. Z)

m s	′	2h	2h 4m	2h 8m	2h 12m	2h 16m	2h 20m	2h 24m	2h 28m	2h 32m	′	m s
		30°	31°	32°	33°	34°	35°	36°	37°	38°		
0	0	1.4750	1.4472	1.4203	1.3943	1.3692	1.3447	1.3211	1.2981	1.2757	0	0
4	1	46	68	1.4199	39	87	43	07	77	54	1	4
8	2	41	63	94	35	83	39	03	73	50	2	8
12	3	36	59	90	31	79	35	1.3199	69	46	3	12
16	4	31	54	86	26	75	31	95	66	43	4	16
20	5	27	50	81	22	71	27	91	62	39	5	20
24	6	22	45	77	18	67	23	87	58	35	6	24
28	7	17	40	73	14	63	19	83	54	32	7	28
32	8	13	36	68	09	59	15	80	51	28	8	32
36	9	08	31	64	05	54	11	76	47	24	9	36
40	10	03	27	60	01	50	07	72	43	21	10	40
44	11	1.4699	22	55	1.3897	46	03	68	39	17	11	44
48	12	94	18	51	92	42	1.3399	64	36	14	12	48
52	13	89	13	46	88	38	95	60	32	10	13	52
56	14	85	09	42	84	34	92	56	28	06	14	56
1	15	80	04	38	80	30	88	52	24	03	15	1
4	16	75	00	33	75	26	84	49	21	1.2699	16	4
8	17	71	1.4395	29	71	22	80	45	17	95	17	8
12	18	66	90	25	67	18	76	41	13	92	18	12
16	19	61	86	20	63	13	72	37	09	88	19	16
20	20	57	82	16	59	09	68	33	06	84	20	20
24	21	52	77	11	54	05	64	29	02	81	21	24
28	22	47	73	07	50	01	60	26	1.2898	77	22	28
32	23	43	68	03	46	1.3597	56	22	94	73	23	32
36	24	38	64	1.4098	42	93	52	18	91	70	24	36
40	25	33	59	94	37	89	48	14	87	66	25	40
44	26	29	55	90	33	85	44	10	83	63	26	44
48	27	24	50	85	29	81	40	06	79	59	27	48
52	28	19	46	81	25	77	36	02	76	55	28	52
56	29	15	41	77	21	73	32	1.3099	72	52	29	56
2	30	1.4610	1.4337	1.4072	1.3816	1.3569	1.3328	1.3095	1.2868	1.2648	30	2
4	31	05	32	68	12	64	24	91	65	45	31	4
8	32	01	28	64	08	60	20	87	61	41	32	8
12	33	1.4596	23	59	04	56	16	83	57	37	33	12
16	34	92	19	55	00	52	12	80	53	34	34	16
20	35	87	14	51	1.3796	48	08	76	50	30	35	20
24	36	82	10	46	91	44	04	72	46	26	36	24
28	37	78	05	42	87	40	01	68	42	23	37	28
32	38	73	01	38	83	36	1.3297	64	39	19	38	32
36	39	69	1.4297	33	79	32	93	60	35	16	39	36
40	40	64	92	29	75	28	89	57	31	12	40	40
44	41	59	88	25	70	24	85	53	27	08	41	44
48	42	55	83	21	66	20	81	49	24	05	42	48
52	43	50	79	16	62	16	77	45	20	01	43	52
56	44	45	74	12	58	12	73	41	16	1.2598	44	56
3	45	41	70	08	54	08	69	38	13	94	45	3
4	46	36	65	03	50	04	65	34	09	90	46	4
8	47	32	61	1.3999	45	00	61	30	05	86	47	8
12	48	27	57	95	41	1.3496	57	26	02	83	48	12
16	49	23	52	90	37	92	53	22	1.2798	80	49	16
20	50	18	48	86	33	88	50	19	94	76	50	20
24	51	13	43	82	29	84	46	15	91	73	51	24
28	52	09	39	78	25	80	42	11	87	69	52	28
32	53	04	34	73	21	76	38	07	83	65	53	32
36	54	00	30	69	16	71	34	03	79	62	54	36
40	55	1.4495	26	65	12	67	30	00	76	58	55	40
44	56	91	21	60	08	63	26	1.2996	72	55	56	44
48	57	86	17	56	04	59	22	92	68	51	57	48
52	58	81	12	52	00	55	18	88	65	47	58	52
56	59	76	08	48	1.3696	51	14	84	61	44	59	56

P. p.

s	5
1	1.25
2	2.50
3	3.75

s	4
1	1
2	2
3	3

s	3
1	0.75
2	1.50
3	2.25

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Logarithmos da hora

T. Z)

m s	′	2h 36m	2h 40m	2h 44m	2h 48m	2h 52m	2h 56m	3h	3h 4m	3h 8m	′	m s	P. p.
		39°	40°	41°	42°	43°	44°	45°	46°	47°			
0	0	1.2540	1.2329	1.2124	1.1924	1.1729	1.1539	1.1353	1.1173	1.0996	0	0	
4	1	37	26	20	20	26	36	50	70	93	1	4	s 4
8	2	33	22	17	17	22	32	47	67	90	2	8	1 1
12	3	30	19	14	14	19	29	44	64	88	3	12	2 2
16	4	26	15	10	10	16	26	41	61	85	4	16	3 3
20	5	23	12	07	07	13	23	38	58	82	5	20	
24	6	19	08	03	04	10	20	35	55	79	6	24	
28	7	15	05	00	00	06	17	32	52	76	7	28	
32	8	12	01	1.2097	1.1897	03	14	29	49	73	8	32	s 3
36	9	08	1.2298	93	94	00	11	26	46	70	9	36	1 0.75
40	10	05	95	90	91	1.1697	08	23	43	67	10	40	2 1.50
44	11	01	91	87	88	94	04	20	40	64	11	44	3 2.25
48	12	1.2498	88	83	84	90	01	17	37	61	12	48	
52	13	94	84	80	81	87	1.1498	14	34	59	13	52	
56	14	91	81	77	78	84	95	11	31	56	14	56	
1	15	87	77	73	74	81	92	08	28	53	15	1	s 2
4	16	83	74	70	71	78	89	05	25	50	16	4	1 0.5
8	17	80	70	67	68	74	86	02	22	47	17	8	2 1.0
12	18	76	67	63	65	71	83	1.1299	19	44	18	12	3 1.5
16	19	73	64	60	61	68	80	96	16	41	19	16	
20	20	69	60	56	58	65	76	93	13	38	20	20	
24	21	66	57	53	55	62	73	90	10	35	21	24	
28	22	62	53	50	52	59	70	87	08	33	22	28	
32	23	59	50	46	48	55	67	84	05	30	23	32	
36	24	55	46	43	45	52	64	81	02	27	24	36	
40	25	52	43	40	42	49	61	78	1.1099	24	25	40	
44	26	48	39	36	39	46	58	75	96	21	26	44	
48	27	45	36	33	35	43	55	72	93	18	27	48	
52	28	41	33	30	32	39	52	69	90	15	28	52	
56	29	38	29	26	29	36	49	66	87	12	29	56	
2	30	1.2434	1.2226	1.2023	1.1826	1.1633	1.1446	1.1263	1.1084	1.0910	30	2	
4	31	31	22	20	22	30	42	60	81	07	31	4	
8	32	27	19	16	19	27	39	56	78	04	32	8	
12	33	24	16	13	16	24	36	53	75	01	33	12	
16	34	20	12	10	13	20	33	50	72	1.0898	34	16	
20	35	16	09	06	09	17	30	47	69	95	35	20	
24	36	13	05	03	06	14	27	44	66	92	36	24	
28	37	09	02	00	03	11	24	41	63	90	37	28	
32	38	06	1.2198	1.1996	00	08	21	38	60	87	38	32	
36	39	02	95	93	1.1796	05	18	35	58	84	39	36	
40	40	1.2399	92	90	93	02	15	32	55	81	40	40	
44	41	95	88	86	90	1.1598	12	29	52	78	41	44	
48	42	92	85	83	86	95	09	26	49	75	42	48	
52	43	88	81	80	83	92	05	23	46	72	43	52	
56	44	85	78	76	80	89	02	20	43	70	44	56	
3	45	81	75	73	77	86	1.1399	17	40	67	45	3	
4	46	78	71	70	74	83	96	14	37	64	46	4	
8	47	74	68	66	71	80	93	11	34	61	47	8	
12	48	71	64	63	67	76	90	08	31	58	48	12	
16	49	67	61	60	64	73	87	06	28	55	49	16	
20	50	64	58	57	61	70	84	03	25	52	50	20	
24	51	61	54	53	58	67	81	00	22	50	51	24	
28	52	57	51	50	54	64	78	1.1197	20	47	52	28	
32	53	54	47	47	51	61	75	94	17	44	53	32	
36	54	50	44	43	48	58	72	91	14	41	54	36	
40	55	47	41	40	45	54	69	88	11	38	55	40	
44	56	43	37	37	42	51	66	85	08	35	56	44	
48	57	40	34	34	38	48	63	82	05	33	57	48	
52	58	36	31	30	35	45	60	79	02	30	58	52	
56	59	33	27	27	32	42	57	76	1.0999	27	59	56	

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Logarithmos da hora

T. Z)

m s	′	3h 12m	3h 16m	3h 20m	3h 24m	3h 28m	3h 32m	3h 36m	3h 40m	3h 44m	′	m s	P. p.
		48°	49°	50°	51°	52°	53°	54°	55°	56°			
0	0	1.0824	1.0656	1.0491	1.0331	1.0173	1.0020	0.9869	0.9722	0.9578	0	0	
4	1	21	53	89	28	71	17	67	20	76	1	4	
8	2	18	50	86	25	68	15	64	17	73	2	8	8 | 3
12	3	15	47	83	23	66	12	62	15	71	3	12	1 | 0.75
16	4	13	45	80	20	63	10	59	12	69	4	16	2 | 1.50
20	5	10	42	77	17	60	07	57	10	66	5	20	3 | 2.25
24	6	07	39	75	15	58	05	54	08	64	6	24	
28	7	04	36	72	12	55	02	52	05	61	7	28	
32	8	01	34	70	09	53	0.9999	50	03	59	8	32	
36	9	1.0798	31	67	07	50	97	47	00	57	9	36	
40	10	96	28	64	04	48	94	45	0.9698	54	10	40	8 | 2
44	11	93	25	62	01	45	92	42	95	52	11	44	1 | 0.5
48	12	90	23	59	1.0299	42	89	40	93	50	12	48	2 | 1.0
52	13	87	20	56	96	40	87	37	91	47	13	52	3 | 1.5
56	14	84	17	53	94	37	84	35	88	45	14	56	
1	15	82	14	51	91	35	82	32	86	43	15	1	
4	16	79	11	48	88	32	79	30	83	40	16	4	
8	17	76	09	45	86	30	77	27	81	38	17	8	
12	18	73	06	43	83	27	74	25	79	35	18	12	
16	19	70	03	40	80	24	72	22	76	33	19	16	
20	20	67	00	37	78	22	69	20	74	31	20	20	
24	21	65	1.0598	35	75	19	67	17	71	28	21	24	
28	22	62	95	32	73	17	64	15	69	26	22	28	
32	23	59	92	29	70	14	62	13	67	24	23	32	
36	24	56	89	27	67	12	59	10	64	21	24	36	
40	25	53	87	24	65	09	57	08	62	19	25	40	
44	26	51	84	21	62	06	54	05	59	17	26	44	
48	27	48	81	19	59	04	52	03	57	14	27	48	
52	28	45	79	16	57	01	49	00	55	12	28	52	
56	29	42	76	13	54	1.0099	47	0.9798	52	10	29	56	
2	30	1.0739	1.0573	1.0410	1.0252	1.0096	0.9944	0.9795	0.9650	0.9507	30	2	
4	31	37	70	08	49	94	42	93	47	05	31	4	
8	32	34	68	05	46	91	39	90	45	02	32	8	
12	33	31	65	02	44	88	37	88	43	00	33	12	
16	34	28	62	00	41	86	34	86	40	0.9498	34	16	
20	35	25	59	1.0397	38	83	32	83	38	95	35	20	
24	36	23	57	94	36	81	29	81	35	93	36	24	
28	37	20	54	92	33	78	27	78	33	91	37	28	
32	38	17	51	89	31	76	24	76	31	88	38	32	
36	39	14	48	86	28	73	22	73	28	86	39	36	
40	40	11	46	84	25	71	19	71	26	84	40	40	
44	41	09	43	81	23	68	17	68	23	81	41	44	
48	42	06	40	78	20	65	14	66	21	79	42	48	
52	43	03	37	76	18	63	12	64	19	77	43	52	
56	44	00	35	73	15	60	09	61	16	74	44	56	
3	45	1.0697	32	70	12	58	07	59	14	72	45	3	
4	46	95	29	68	10	55	04	56	11	70	46	4	
8	47	92	27	65	07	53	02	54	09	67	47	8	
12	48	89	24	62	05	50	0.9899	51	07	65	48	12	
16	49	86	21	60	02	48	97	49	04	63	49	16	
20	50	84	18	57	1.0199	45	94	46	02	60	50	20	
24	51	81	16	54	97	43	92	44	0.9599	58	51	24	
28	52	78	13	52	94	40	89	42	97	56	52	28	
32	53	75	10	49	92	37	87	39	95	53	53	32	
36	54	72	08	46	89	35	84	37	92	51	54	36	
40	55	70	05	44	86	32	82	34	90	49	55	40	
44	56	67	02	41	84	30	79	32	88	46	56	44	
48	57	64	1.0499	39	81	27	77	29	85	44	57	48	
52	58	61	97	36	79	25	74	27	83	42	58	52	
56	59	58	94	33	76	22	72	25	80	39	59	56	

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Logarithmos da hora

T. Z)

m s	′	3h 48m	3h 52m	3h 56m	4h	4h 4m	4h 8m	4h 12m	4h 16m	4h 20m	′	m s	P. p.
		57°	58°	59°	60°	61°	62°	63°	64°	65°			
☉	0	0.9437	0.9299	0.9163	0.9031	0.8901	0.8773	0.8649	0.8526	0.8406	0	☉	
4	1	35	97	61	29	0.8899	71	47	24	04	1	4	s 3
8	2	32	94	59	26	97	69	44	22	02	2	8	1 0.75
12	3	30	92	57	24	94	67	42	20	00	3	12	2 1.50
16	4	28	90	55	22	92	65	40	18	0.8398	4	16	3 2.25
20	5	25	87	52	20	90	63	38	16	96	5	20	
24	6	23	85	50	18	88	61	36	14	94	6	24	
28	7	21	83	48	16	86	59	34	12	92	7	28	
32	8	18	81	46	13	84	57	32	10	90	8	32	
36	9	16	78	43	11	82	55	30	08	88	9	36	
40	10	14	76	41	09	79	52	28	06	86	10	40	
44	11	11	74	39	07	77	50	26	04	84	11	44	s 2
48	12	09	72	37	05	75	48	24	02	82	12	48	1 0.5
52	13	07	69	35	02	73	46	22	00	80	13	52	2 1.0
56	14	04	67	32	00	71	44	20	0.8498	78	14	56	3 1.5
☽	15	02	65	30	0.8998	69	42	18	96	76	15	☽	
4	16	00	62	28	96	67	40	16	94	74	16	4	
8	17	0.9398	60	26	94	65	38	14	92	72	17	8	
12	18	95	58	23	92	62	36	12	90	70	18	12	
16	19	93	56	21	89	60	34	09	88	68	19	16	
20	20	91	53	19	87	58	32	07	86	66	20	20	
24	21	88	51	17	85	56	29	05	84	64	21	24	
28	22	86	49	15	83	54	27	03	82	62	22	28	
32	23	84	47	12	81	52	25	01	80	60	23	32	
36	24	81	44	10	79	50	23	0.8599	78	59	24	36	
40	25	79	42	08	76	47	21	97	76	57	25	40	
44	26	77	40	06	74	45	19	95	74	55	26	44	
48	27	74	38	03	72	43	17	93	72	53	27	48	
52	28	72	35	01	70	41	15	91	70	51	28	52	
56	29	70	33	0.9099	68	39	13	89	68	49	29	56	
♃	30	0.9368	0.9231	0.9097	0.8966	0.8837	0.8711	0.8587	0.8466	0.8347	30	♃	
4	31	65	29	95	63	35	09	85	64	45	31	4	
8	32	63	26	92	61	33	07	83	62	43	32	8	
12	33	61	24	90	59	30	04	81	60	41	33	12	
16	34	58	22	88	57	28	02	79	58	39	34	16	
20	35	56	20	86	55	26	00	77	56	37	35	20	
24	36	54	17	84	53	24	0.8698	75	54	35	36	24	
28	37	51	15	81	50	22	96	73	52	33	38	28	
32	38	49	13	79	48	20	94	71	50	31	37	32	
36	39	47	11	77	46	18	92	69	48	29	39	36	
40	40	45	08	75	44	16	90	67	46	27	40	40	
44	41	42	06	73	42	14	88	65	44	25	41	44	
48	42	40	04	70	40	11	86	63	42	23	42	48	
52	43	38	02	68	37	09	84	61	40	21	43	52	
56	44	35	0.9199	66	35	07	82	58	38	19	44	56	
♂	45	33	97	64	33	05	80	56	36	17	45	♂	
4	46	31	95	62	31	03	77	54	34	15	46	4	
8	47	29	93	59	29	01	75	52	32	13	47	8	
12	48	26	90	57	27	0.8799	73	50	30	11	48	12	
16	49	24	88	55	25	97	71	48	28	10	49	16	
20	50	22	86	53	22	95	69	46	26	08	50	20	
24	51	19	84	51	20	92	67	44	24	06	51	24	
28	52	17	81	48	18	90	65	42	22	04	52	28	
32	53	15	79	46	16	88	63	40	20	02	53	32	
36	54	13	77	44	14	86	61	38	18	00	54	36	
40	55	10	75	42	12	84	59	36	16	0.8298	55	40	
44	56	08	72	40	09	82	57	34	14	96	56	44	
48	57	06	70	37	07	80	55	32	12	94	57	48	
52	58	03	68	35	05	78	53	30	10	92	58	52	
56	59	01	66	33	03	76	51	28	08	90	59	56	

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Logarithmos da hora

T. Z)

m s	′	4h 24m	4h 28m	4h 32m	4h 36m	4h 40m	4h 44m	4h 48m	4h 52m	4h 56m	′	m s
		66°	67°	68°	69°	70°	71°	72°	73°	74°		
0	0	0.8288	0.8172	0.8059	0.7948	0.7838	0.7731	0.7626	0.7522	0.7421	0	0
4	1	86	71	57	46	37	29	24	21	19	1	
8	2	84	69	55	44	35	28	22	19	18	2	
12	3	82	67	53	42	33	26	21	17	16	3	1
16	4	80	65	52	40	31	24	19	16	14	4	1
20	5	78	63	50	39	29	22	17	14	13	5	2
24	6	76	61	48	37	28	21	15	12	11	6	2
28	7	74	59	46	35	26	19	14	11	09	7	2
32	8	73	57	44	33	24	17	12	09	08	8	3
36	9	71	55	42	31	22	15	10	07	06	9	3
40	10	69	53	40	29	20	13	09	05	04	10	4
44	11	67	52	38	28	19	12	07	04	03	11	4
48	12	65	50	37	26	17	10	05	02	01	12	4
52	13	63	48	35	24	15	08	03	00	0.7399	13	5
56	14	61	46	33	22	13	06	02	0.7499	98	14	5
1	15	59	44	31	20	11	05	00	97	96	15	1
4	16	57	42	29	18	10	03	0.7598	95	94	16	
8	17	55	40	27	17	08	01	96	94	93	17	
12	18	53	38	25	15	06	0.7699	95	92	91	18	1
16	19	51	36	24	13	04	98	93	90	89	19	1
20	20	49	34	22	11	02	96	91	88	88	20	2
24	21	47	33	20	09	01	94	89	87	86	21	2
28	22	45	31	18	07	0.7799	92	88	85	84	22	2
32	23	43	29	16	06	97	91	86	83	83	23	3
36	24	41	27	14	04	95	89	84	82	81	24	3
40	25	40	25	12	02	93	87	83	80	79	25	4
44	26	38	23	11	00	92	85	81	78	78	26	4
48	27	36	21	09	0.7898	90	84	79	77	76	27	4
52	28	34	19	07	96	88	82	77	75	74	28	5
56	29	32	17	05	95	86	80	76	73	73	29	5
2	30	0.8230	0.8115	0.8003	0.7893	0.7785	0.7678	0.7574	0.7472	0.7371	30	2
4	31	28	14	01	91	83	77	72	70	69	31	
8	32	26	12	0.7999	89	81	75	71	68	68	32	
12	33	24	10	98	87	79	73	69	66	66	33	1
16	34	22	08	96	86	77	71	67	65	64	34	1
20	35	20	06	94	84	76	70	65	63	63	35	2
24	36	18	04	92	82	73	68	64	61	61	36	2
28	37	17	02	90	80	72	66	62	60	59	37	2
32	38	15	00	88	78	70	64	60	58	58	38	3
36	39	13	0.8098	86	76	68	63	58	56	56	39	3
40	40	11	97	85	75	67	61	57	55	54	40	4
44	41	09	95	83	73	65	59	55	53	53	41	4
48	42	07	93	81	71	63	57	53	51	51	42	4
52	43	05	91	79	69	61	56	52	50	49	43	5
56	44	03	89	77	67	60	54	50	48	48	44	5
3	45	01	87	75	66	58	52	48	46	45	45	3
4	46	0.8199	85	73	64	56	50	46	45	44	46	
8	47	97	83	72	62	54	49	45	43	43	47	
12	48	95	82	70	60	52	47	43	41	41	48	1
16	49	93	80	68	58	51	45	41	39	39	49	1
20	50	92	78	66	56	49	43	40	38	38	50	2
24	51	90	76	64	55	47	42	38	36	36	51	2
28	52	88	74	62	53	45	40	36	34	34	52	2
32	53	86	72	61	51	44	38	34	33	33	53	3
36	54	84	70	59	49	42	36	33	31	31	54	3
40	55	82	68	57	47	40	35	31	29	30	55	4
44	56	80	67	55	46	38	33	29	28	28	56	4
48	57	78	65	53	44	36	31	28	26	26	57	4
52	58	76	63	51	42	35	29	26	24	25	58	5

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Logarithmos da hora

T. Z)

m s	′	5h	5h 4m	5h 8m	5h 12m	5h 16m	5h 20m	5h 24m	5h 28m	[illegible]
		75°	76°	77°	78°	79°	80°	81°	82°	[illegible]
☉	0	0.7321	0.7223	0.7127	0.7033	0.6940	0.6849	0.6759	0.6671	0
4	1	20	22	26	31	39	47	58	70	
8	2	18	20	24	30	37	46	56	68	
12	3	16	19	22	28	35	44	55	67	
16	4	15	17	21	27	34	43	53	66	
20	5	13	15	19	25	32	41	52	64	
24	6	11	14	18	23	31	40	50	63	
28	7	10	12	16	22	29	38	49	61	
32	8	08	10	15	20	28	37	48	60	
36	9	06	09	13	19	26	35	46	58	
40	10	05	07	11	17	25	34	45	57	
44	11	03	06	10	16	23	32	43	55	
48	12	02	04	08	14	22	31	42	54	
52	13	00	02	07	13	20	29	41	53	
56	14	0.7298	01	05	11	19	28	39	51	
☽	15	97	0.7199	03	09	17	26	37	50	
4	16	95	98	02	08	16	25	36	48	
8	17	93	96	00	06	14	23	34	47	
12	18	92	94	0.7099	05	13	22	33	45	
16	19	90	93	97	03	11	20	31	44	58
20	20	88	91	96	02	09	19	30	42	56
24	21	87	90	94	00	08	17	28	41	55
28	22	85	88	92	0.6999	06	16	27	40	54
32	23	84	86	91	97	05	14	25	38	52
36	24	82	85	89	96	03	13	24	37	51
40	25	80	83	88	94	02	11	23	35	49
44	26	79	82	86	92	00	10	21	34	48
48	27	77	80	85	91	0.6899	08	20	32	47
52	28	75	78	83	89	97	07	18	31	45
56	29	74	77	81	88	96	05	17	29	44
☉	30	0.7272	0.7175	0.7080	0.6986	0.6894	0.6804	0.6715	0.6628	0.6542
4	31	71	74	78	85	93	02	14	27	41
8	32	69	72	77	83	91	01	12	25	39
12	33	67	70	75	82	90	0.6799	11	24	38
16	34	66	69	74	80	88	98	09	22	37
20	35	64	67	72	79	87	96	08	21	35
24	36	62	66	70	77	85	95	06	19	34
28	37	61	64	69	76	84	93	05	18	32
32	38	59	62	67	74	82	92	03	16	31
36	39	57	61	66	72	81	91	02	15	30
40	40	56	59	64	71	79	89	01	14	28
44	41	54	58	63	69	78	88	0.6699	12	27
48	42	53	56	61	68	76	86	98	11	25
52	43	51	54	59	66	75	85	96	09	24
56	44	49	53	58	65	73	83	95	08	23
☽	45	48	51	56	63	72	82	93	06	21
4	46	46	50	55	62	70	80	92	05	20
8	47	44	48	53	60	69	79	90	04	18
12	48	43	46	52	58	67	77	89	02	17
16	49	41	45	50	57	66	76	87	01	15
20	50	40	43	49	55	64	74	86	0.6599	14
24	51	38	42	47	54	62	73	84	98	13
28	52	36	40	46	52	61	71	83	96	11
32	53	35	38	44	51	59	70	82	95	10
36	54	33	37	42	49	58	68	80	94	08
40	55	32	35	41	48	56	67	79	92	07
44	56	30	34	39	46	55	65	77	91	06
48	57	28	32	37	45	53	64	76	89	04
52	58	27	30	36	43	52	62	74	88	03
56	59	25	29	34	42	51	61	73	86	01

19	16	tonds to militarism and dictatorsh
20	20	in this opinion in human history or
21	24	1 dictatorship have developed
22	28	romained free and republican with
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Logarithmos da hora

T. Z)

m s	′	5h 36m	5h 40m	5h 44m	5h 48m	5h 52m	5h 56m	6h	6h 4m	6h 8m	′	m s
		84°	85°	86°	87°	88°	89°	90°	91°	92°		
0	0	0.6500	0.6417	0.6335	0.6254	0.6175	0.6097	0.6021	0.5945	0.5872	0	0
4	1	0.6499	15	33	53	73	96	19	44	70	1	4
8	2	97	14	32	51	72	94	18	43	69	2	8
12	3	96	12	31	50	71	93	17	42	68	3	12
16	4	94	11	29	49	70	92	16	40	67	4	16
20	5	93	10	28	47	68	91	14	39	65	5	20
24	6	92	09	26	46	67	89	13	38	64	6	24
28	7	90	08	25	45	66	88	12	37	63	7	28
32	8	89	06	24	43	64	87	10	35	62	8	32
36	9	87	04	22	42	63	85	09	34	61	9	36
40	10	86	03	21	41	62	84	08	33	59	10	40
44	11	85	01	20	39	60	83	07	32	58	11	44
48	12	83	00	18	38	59	82	05	31	57	12	48
52	13	82	0.6399	17	37	58	80	04	29	56	13	52
56	14	80	97	16	35	57	79	03	28	55	14	56
1	15	79	96	14	34	55	78	02	27	53	15	1
4	16	78	95	13	33	54	76	00	26	52	16	4
8	17	76	93	12	31	53	75	0.5999	24	51	17	8
12	18	75	92	10	30	51	74	98	23	50	18	12
16	19	73	90	09	29	50	73	97	22	48	19	16
20	20	72	89	08	27	49	71	95	21	47	20	20
24	21	71	88	06	26	47	70	94	19	46	21	24
28	22	69	86	05	25	46	69	93	18	45	22	28
32	23	68	85	04	23	45	68	92	17	44	23	32
36	24	66	84	02	22	44	66	90	16	42	24	36
40	25	65	82	01	21	42	65	89	14	41	25	40
44	26	64	81	0.6299	20	41	64	88	13	40	26	44
48	27	62	80	98	18	40	62	87	12	39	27	48
52	28	61	78	97	17	38	61	85	11	38	28	52
56	29	60	77	95	16	37	60	84	10	36	29	56
2	30	0.6458	0.6375	0.6294	0.6214	0.6136	0.6059	0.5983	0.5908	0.5835	30	2
4	31	57	74	93	13	34	57	82	07	34	31	4
8	32	55	73	91	12	33	56	80	06	33	32	8
12	33	54	71	90	10	32	55	79	05	32	33	12
16	34	53	70	89	09	31	54	78	03	30	34	16
20	35	51	69	87	08	29	52	77	02	29	35	20
24	36	50	67	86	06	28	51	75	01	28	36	24
28	37	48	66	85	05	27	50	74	00	27	37	28
32	38	47	64	83	03	25	48	73	0.5898	25	38	32
36	39	46	63	82	02	24	47	72	97	24	39	36
40	40	44	62	81	01	23	46	70	96	23	40	40
44	41	43	60	79	00	22	45	69	95	22	41	44
48	42	41	59	78	0.6198	20	43	68	94	21	42	48
52	43	40	58	77	97	19	42	67	92	19	43	52
56	44	39	56	75	96	18	41	65	91	18	44	56
3	45	37	55	74	94	16	40	64	90	17	45	3
4	46	36	54	73	93	15	38	63	89	16	46	4
8	47	35	52	71	92	14	37	62	87	15	47	8
12	48	33	51	70	91	13	36	60	86	13	48	12
16	49	32	50	69	89	11	34	59	85	12	49	16
20	50	30	48	67	88	10	33	58	84	11	50	20
24	51	29	47	66	87	09	32	57	83	10	51	24
28	52	28	45	65	85	07	31	55	81	09	52	28
32	53	26	44	63	84	06	29	54	80	07	53	32
36	54	25	43	62	83	05	28	53	79	06	54	36
40	55	23	41	61	81	03	27	52	78	05	55	40
44	56	22	40	59	80	02	26	50	76	04	56	44
48	57	21	39	58	79	01	24	49	75	03	57	48
52	58	19	37	57	77	00	23	48	74	01	58	52
56	[illegible]	[illegible]	36	55	76	0.6098	[illegible]	[illegible]	[illegible]	[illegible]	59	56

s	P. p.
1	2
2	0.5
3	1.0
	1.5

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Logarithmos da hora

T. Z)

m s	′	5h	5h 4m	5h 8m	5h 12m	5h 16m	5h 20m	5h 24m	5h 28m	5
		75°	76°	77°	78°	79°	80°	81°	82°	8
0	0	0.7321	0.7223	0.7127	0.7033	0.6940	0.6849	0.6759	0.6671	0.(
4	1	20	22	26	31	39	47	58	70	
8	2	18	20	24	30	37	46	56	68	
12	3	16	19	22	28	35	44	55	67	
16	4	15	17	21	27	34	43	53	66	
20	5	13	15	19	25	32	41	52	64	
24	6	11	14	18	23	31	40	50	63	
28	7	10	12	16	22	29	38	49	61	
32	8	08	10	15	20	28	37	48	60	
36	9	06	09	13	19	26	35	46	58	
40	10	05	07	11	17	25	34	45	57	
44	11	03	06	10	16	23	32	43	55	
48	12	02	04	08	14	22	31	42	54	
52	13	00	02	07	13	20	29	41	53	
56	14	0.7298	01	05	11	19	28	39	51	
1	15	97	0.7199	03	09	17	26	37	50	
4	16	95	98	02	08	16	25	36	48	
8	17	93	96	00	06	14	23	34	47	
12	18	92	94	0.7099	05	13	22	33	45	
16	19	90	93	97	03	11	20	31	44	58
20	20	88	91	96	02	09	19	30	42	56
24	21	87	90	94	00	08	17	28	41	55
28	22	85	88	92	0.6999	06	16	27	40	54
32	23	84	86	91	97	05	14	25	38	52
36	24	82	85	89	96	03	13	24	37	51
40	25	80	83	88	94	02	11	23	35	49
44	26	79	82	86	92	00	10	21	34	48
48	27	77	80	85	91	0.6899	08	20	32	47
52	28	75	78	83	89	97	07	18	31	45
56	29	74	77	81	88	96	05	17	29	44
2	30	0.7272	0.7175	0.7080	0.6986	0.6894	0.6804	0.6715	0.6628	0.6542
4	31	71	74	78	85	93	02	14	27	41
8	32	69	72	77	83	91	01	12	25	39
12	33	67	70	75	82	90	0.6799	11	24	38
16	34	66	69	74	80	88	98	09	22	37
20	35	64	67	72	79	87	96	08	21	35
24	36	62	66	70	77	85	95	06	19	34
28	37	61	64	69	76	84	93	05	18	32
32	38	59	62	67	74	82	92	03	16	31
36	39	57	61	66	72	81	91	02	15	30
40	40	56	59	64	71	79	89	01	14	28
44	41	54	58	63	69	78	88	0.6699	12	27
48	42	53	56	61	68	76	86	98	11	25
52	43	51	54	59	66	75	85	96	09	24
56	44	49	53	58	65	73	83	95	08	23
3	45	48	51	56	63	72	82	93	06	21
4	46	46	50	55	62	70	80	92	05	20
8	47	44	48	53	60	69	79	90	04	18
12	48	43	46	52	58	67	77	89	02	17
16	49	41	45	50	57	66	76	87	01	15
20	50	40	43	49	55	64	74	86	0.6599	14
24	51	38	42	47	54	62	73	84	98	13
28	52	36	40	46	52	61	71	83	96	11
32	53	35	38	44	51	59	70	82	95	10
36	54	33	37	42	49	58	68	80	94	08
40	55	32	35	41	48	56	67	79	92	07
44	56	30	34	39	46	55	65	77	91	06
48	57	28	32	37	45	53	64	76	89	04
52	58	27	30	36	43	52	62	74	88	03
56	59	25	29	34	42	51	61	73	86	01

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tonds to militarism and dictator-
this opinion in human history or
i dictatorship havo dovolopod
remained froo and republican with

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Logarithmos da hora

T. Z)

m s	′	5h 36m	5h 40m	5h 44m	5h 48m	5h 52m	5h 56m	6h	6h 4m	6h 8m	′	m s	P. p.
		84°	85°	86°	87°	88°	89°	90°	91°	92°			
0	0	0.6500	0.6417	0.6335	0.6254	0.6175	0.6097	0.6021	0.5945	0.5872	0	0	
4	1	0.6499	15	33	53	73	96	19	44	70	1	4	
8	2	97	14	32	51	72	94	18	43	69	2	8	
12	3	96	12	31	50	71	93	17	42	68	3	12	s | 2
16	4	94	11	29	49	70	92	16	40	67	4	16	1 | 0.5
20	5	93	10	28	47	68	91	14	39	65	5	20	2 | 1.0
24	6	92	09	26	46	67	89	13	38	64	6	24	3 | 1.5
28	7	90	08	25	45	66	88	12	37	63	7	28	
32	8	89	06	24	43	64	87	10	35	62	8	32	
36	9	87	04	22	42	63	85	09	34	61	9	36	
40	10	86	03	21	41	62	84	08	33	59	10	40	
44	11	85	01	20	39	60	83	07	32	58	11	44	
48	12	83	00	18	38	59	82	05	31	57	12	48	
52	13	82	0.6399	17	37	58	80	04	29	56	13	52	
56	14	80	97	16	35	57	79	03	28	55	14	56	
1	15	79	96	14	34	55	78	02	27	53	15	1	
4	16	78	95	13	33	54	76	00	26	52	16	4	
8	17	76	93	12	31	53	75	0.5999	24	51	17	8	
12	18	75	92	10	30	51	74	98	23	50	18	12	
16	19	73	90	09	29	50	73	97	22	48	19	16	
20	20	72	89	08	27	49	71	95	21	47	20	20	
24	21	71	88	06	26	47	70	94	19	46	21	24	
28	22	69	86	05	25	46	69	93	18	45	22	28	
32	23	68	85	04	23	45	68	92	17	44	23	32	
36	24	66	84	02	22	44	66	90	16	42	24	36	
40	25	65	82	01	21	42	65	89	14	41	25	40	
44	26	64	81	0.6299	20	41	64	88	13	40	26	44	
48	27	62	80	98	18	40	62	87	12	39	27	48	
52	28	61	78	97	17	38	61	85	11	38	28	52	
56	29	60	77	95	16	37	60	84	10	36	29	56	
2	30	0.6458	0.6375	0.6294	0.6214	0.6136	0.6059	0.5983	0.5908	0.5835	30	2	
4	31	57	74	93	13	34	57	82	07	34	31	4	
8	32	55	73	91	12	33	56	80	06	33	32	8	
12	33	54	71	90	10	32	55	79	05	32	33	12	
16	34	53	70	89	09	31	54	78	03	30	34	16	
20	35	51	69	87	08	29	52	77	02	29	35	20	
24	36	50	67	86	06	28	51	75	01	28	36	24	
28	37	48	66	85	05	27	50	74	00	27	37	28	
32	38	47	64	83	03	25	48	73	0.5898	25	38	32	
36	39	46	63	82	02	24	47	72	97	24	39	36	
40	40	44	62	81	01	23	46	70	96	23	40	40	
44	41	43	60	79	00	22	45	69	95	22	41	44	
48	42	41	59	78	0.6198	20	43	68	94	21	42	48	
52	43	40	58	77	97	19	42	67	92	19	43	52	
56	44	39	56	75	96	18	41	65	91	18	44	56	
3	45	37	55	74	94	16	40	64	90	17	45	3	
4	46	36	54	73	93	15	38	63	89	16	46	4	
8	47	35	52	71	92	14	37	62	87	15	47	8	
12	48	33	51	70	91	13	36	60	86	13	48	12	
16	49	32	50	69	89	11	34	59	85	12	49	16	
20	50	30	48	67	88	10	33	58	84	11	50	20	
24	51	29	47	66	87	09	32	57	83	10	51	24	
28	52	28	45	65	85	07	31	55	81	09	52	28	
32	53	26	44	63	84	06	29	54	80	07	53	32	
36	54	25	43	62	83	05	28	53	79	06	54	36	
40	55	23	41	61	81	03	27	52	78	05	55	40	
44	56	22	40	59	80	02	26	50	76	04	56	44	
48	57	21	39	58	79	01	24	49	75	03	57	48	
52	58	19	37	57	77	00	23	48	74	01	58	52	
56	59	18	36	55	76	0.6098	22	47	73	00	59	56	

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Logarithmos da hora

T. Z)

m s	′	6ʰ 12ᵐ 93°	6ʰ 16ᵐ 94°	6ʰ 20ᵐ 95°	6ʰ 24ᵐ 96°	6ʰ 28ᵐ 97°	6ʰ 32ᵐ 98°	6ʰ 36ᵐ 99°	6ʰ 40ᵐ 100°	6ʰ 44ᵐ 101°	′	m s
0	0	0.5799	0.5728	0.5658	0.5589	0.5521	0.5455	0.5389	0.5325	0.5262	0	0
4	1	98	27	56	88	20	53	88	24	61	1	4
8	2	97	25	55	87	19	52	87	23	60	2	8
12	3	95	24	54	85	18	51	86	22	59	3	12
16	4	94	23	53	84	17	50	85	21	58	4	16
20	5	93	22	52	83	16	49	84	20	57	5	20
24	6	92	21	51	82	14	48	83	19	56	6	24
28	7	91	19	50	81	13	47	82	18	55	7	28
32	8	89	18	48	80	12	46	81	17	54	8	32
36	9	88	17	47	79	11	45	80	16	53	9	36
40	10	87	16	46	77	10	44	79	15	52	10	40
44	11	86	15	45	76	09	43	77	14	51	11	44
48	12	85	14	44	75	08	41	76	12	50	12	48
52	13	83	12	43	74	07	40	75	11	49	13	52
56	14	82	11	41	73	06	39	74	10	48	14	56
1	15	81	10	40	72	04	38	73	09	47	15	1
4	16	80	09	39	71	03	37	72	08	46	16	4
8	17	79	08	38	69	02	36	71	07	45	17	8
12	18	77	07	37	68	01	35	70	06	43	18	12
16	19	76	05	36	67	00	34	69	05	42	19	16
20	20	75	04	35	66	0.5499	33	68	04	41	20	20
24	21	74	03	33	65	98	32	67	03	40	21	24
28	22	73	02	32	64	97	31	66	02	39	22	28
32	23	72	01	31	63	96	29	65	01	38	23	32
36	24	70	00	30	62	94	28	64	00	37	24	36
40	25	69	0.5698	29	60	93	27	62	0.5299	36	25	40
44	26	68	97	28	59	92	26	61	98	35	26	44
48	27	67	96	26	58	91	25	60	97	34	27	48
52	28	66	95	25	57	90	24	59	96	33	28	52
56	29	64	94	24	56	89	23	58	95	32	29	56
2	30	0.5763	0.5693	0.5623	0.5555	0.5488	0.5422	0.5357	0.5294	0.5231	30	2
4	31	62	91	22	54	87	21	56	93	30	31	4
8	32	61	90	21	53	86	20	55	91	29	32	8
12	33	60	89	20	51	84	19	54	90	28	33	12
16	34	58	88	18	50	83	18	53	89	27	34	16
20	35	57	87	17	49	82	17	52	88	26	35	20
24	36	56	86	16	48	81	15	51	87	25	36	24
28	37	55	84	15	47	80	14	50	86	24	37	28
32	38	54	83	14	46	79	13	49	85	23	38	32
36	39	53	82	13	45	78	12	48	84	22	39	36
40	40	51	81	12	44	77	11	46	83	21	40	40
44	41	50	80	10	42	76	10	45	82	20	41	44
48	42	49	79	09	41	74	09	44	81	19	42	48
52	43	48	77	08	40	73	08	43	80	18	43	52
56	44	47	76	07	39	72	07	42	79	17	44	56
3	45	45	75	06	38	71	06	41	78	16	45	3
4	46	44	74	05	37	70	04	40	77	15	46	4
8	47	43	73	04	36	69	03	39	76	14	47	8
12	48	42	72	02	35	68	02	38	75	12	48	12
16	49	41	70	01	33	67	01	37	74	11	49	16
20	50	39	69	00	32	66	00	36	73	10	50	20
24	51	38	68	0.5599	31	65	0.5399	35	72	09	51	24
28	52	37	67	98	30	63	98	34	70	08	52	28
32	53	36	66	97	29	62	97	33	69	07	53	32
36	54	35	65	96	28	61	96	32	68	06	54	36
40	55	34	63	94	27	60	95	30	67	05	55	40
44	56	32	62	93	26	59	94	29	66	04	56	44
48	57	31	61	92	24	58	93	28	65	03	57	48
52	58	30	60	91	23	57	91	27	64	02	58	52
56	59	29	59	90	22	56	90	26	63	01	59	56

P. p.

s	2
1	0.5
2	1.0
3	1.5

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Logarithmos da hora

T. Z)

m s	° ′	6h 48m	6h 56m	7h 4m	7h 12m	7h 20m	7h 28m	7h 36m	7h 44m	7h 52m	° ′	m s
		102°	104°	106°	108°	110°	112°	114°	116°	118°		
0 0	0 0	0.5200	0.5080	0.4963	0.4851	0.4743	0.4639	0.4538	0.4442	0.4349	0 0	0 0
8	2	0.5198	78	60	49	41	37	37	40	47	2	8
16	4	96	76	59	47	39	35	35	39	46	4	16
24	6	94	74	58	46	38	34	34	37	44	6	24
32	8	92	72	56	44	36	32	32	36	43	8	32
40	10	90	70	54	42	34	30	30	34	41	10	40
48	12	88	68	52	40	32	29	29	32	40	12	48
56	14	86	66	50	38	31	27	27	31	38	14	56
1 4	16	84	64	48	36	29	25	25	29	37	16	1 4
12	18	82	62	46	35	27	23	24	28	35	18	12
20	20	80	60	44	33	25	22	22	26	34	20	20
28	22	78	58	42	31	24	20	20	25	32	22	28
36	24	76	56	41	29	22	18	19	23	31	24	36
44	26	74	54	39	27	20	17	17	21	29	26	44
52	28	72	52	37	26	18	15	16	20	28	28	52
2 0	30	70	50	35	24	17	13	14	18	26	30	2 0
8	32	68	48	33	22	15	12	12	17	25	32	8
16	34	66	46	31	20	13	10	11	15	23	34	16
24	36	64	44	29	18	11	08	09	14	22	36	24
32	38	62	42	27	16	10	07	07	12	20	38	32
40	40	60	40	25	15	08	05	06	10	19	40	40
48	42	57	38	23	13	06	03	04	09	17	42	48
56	44	55	36	22	11	04	02	02	07	16	44	56
3 4	46	53	35	20	09	03	00	01	06	14	46	3 4
12	48	51	33	18	07	01	0.4598	0.4499	04	13	48	12
20	50	49	31	16	06	0.4699	96	98	03	11	50	20
28	52	47	29	13	04	97	95	96	01	10	52	28
36	54	45	27	12	02	96	93	94	00	08	54	36
44	56	43	25	10	00	94	91	93	0.4398	07	56	44
52	58	41	23	09	0.4798	92	90	91	96	05	58	52
4 0	1 0	0.5139	0.5021	0.4907	0.4797	0.4690	0.4588	0.4490	0.4395	0.4304	1 0	4 0
8	2	37	19	05	95	89	86	88	93	02	2	8
16	4	35	17	03	93	87	85	86	92	01	4	16
24	6	33	15	01	91	85	83	85	90	0.4299	6	24
32	8	31	13	0.4899	89	83	81	83	89	98	8	32
40	10	29	11	97	88	82	80	82	87	96	10	40
48	12	27	09	95	86	80	78	80	86	95	12	48
56	14	25	07	94	84	78	76	78	84	93	14	56
5 4	16	23	05	92	82	76	75	77	83	92	16	5 4
12	18	21	04	90	80	75	73	75	81	90	18	12
20	20	19	02	88	79	73	71	74	80	89	20	20
28	22	17	00	86	77	71	70	72	78	88	22	28
36	24	15	0.4998	84	75	70	68	70	76	86	24	36
44	26	13	96	82	73	68	66	69	75	85	26	44
52	28	11	94	81	71	66	65	67	73	83	28	52
6 0	30	09	92	79	70	64	63	66	72	82	30	6 0
8	32	07	90	77	68	63	61	64	70	80	32	8
16	34	05	88	75	66	61	60	62	69	79	34	16
24	36	03	86	73	64	59	58	61	67	77	36	24
32	38	01	84	71	62	58	57	59	66	76	38	32
40	40	0.5099	82	70	61	56	55	58	64	74	40	40
48	42	97	80	68	59	54	53	56	63	73	42	48
56	44	95	79	66	57	52	51	55	61	71	44	56
7 4	46	93	77	64	55	51	50	53	60	70	46	7 4
12	48	91	75	62	54	49	48	51	58	68	48	12
20	50	89	73	60	52	47	47	50	57	67	50	20
28	52	87	71	58	50	46	45	48	55	65	52	28
36	54	85	69	57	48	44	43	47	53	64	54	36
44	56	83	67	55	47	42	42	45	52	63	56	44
52	58	81	65	53	45	40	40	43	50	61	58	52

P. p.

s	2
1	0.25
2	0.50
3	0.75
4	1.00
5	1.25
6	1.50
7	1.75

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Logarithmos da hora

T. Z)

m s	° ′	8h	8h 8m	8h 16m	8h 24m	8h 32m	8h 40m	8h 48m	8h 56m	9h 4m	9h 12m	° ′	m s
		120°	122°	124°	126°	128°	130°	132°	134°	136°	138°		
0 0	0 0	0.4260	0.4174	0.4092	0.4013	0.3937	0.3865	0.3796	0.3730	0.3667	0.3607	0 0	0 0
8	2	58	72	90	11	36	64	95	29	66	06	2	8
16	4	57	71	89	10	35	62	93	28	65	05	4	16
24	6	55	70	88	09	33	61	92	27	64	04	6	24
32	8	54	68	86	07	32	60	91	25	63	03	8	32
40	10	52	67	85	06	31	59	90	24	62	02	10	40
48	12	51	65	84	05	30	58	89	23	61	01	12	48
56	14	49	64	82	04	28	57	88	22	60	00	14	56
1 4	16	48	63	81	02	27	55	87	21	59	0.3599	16	1 4
12	18	47	61	79	01	26	54	86	20	58	99	18	12
20	20	45	60	78	00	25	53	84	19	57	98	20	20
28	22	44	59	77	0.3999	24	52	83	18	56	97	22	28
36	24	42	57	75	97	22	51	82	17	55	96	24	36
44	26	41	56	74	96	21	49	81	16	54	95	26	44
52	28	39	54	73	95	20	48	80	15	53	94	28	52
2 0	30	38	53	72	93	19	47	79	14	52	93	30	2 0
8	32	36	52	70	92	17	46	78	13	51	92	32	8
16	34	35	50	69	91	16	45	77	12	50	91	34	16
24	36	34	49	68	90	15	44	76	11	49	90	36	24
32	38	32	47	66	88	14	43	74	10	48	89	38	32
40	40	31	46	65	87	13	41	73	08	47	88	40	40
48	42	29	45	64	86	11	40	72	07	46	87	42	48
56	44	28	43	62	85	10	39	71	06	45	86	44	56
3 4	46	26	42	61	83	09	38	70	05	44	85	46	3 4
12	48	25	41	60	82	08	37	69	04	43	84	48	12
20	50	23	39	58	81	07	36	68	03	42	83	50	20
28	52	22	38	57	79	05	34	67	02	41	82	52	28
36	54	21	36	56	78	04	33	66	01	40	81	54	36
44	56	19	35	54	77	03	32	64	00	39	80	56	44
52	58	18	34	53	76	02	31	63	0.3699	38	79	58	52
4 0	1 0	0.4216	0.4132	0.4051	0.3974	0.3900	0.3830	0.3762	0.3698	0.3637	0.3578	1 0	4 0
8	2	15	31	50	73	0.3899	29	61	97	36	78	2	8
16	4	13	30	49	72	98	27	60	96	35	77	4	16
24	6	12	28	48	71	97	26	59	95	34	76	6	24
32	8	11	27	46	69	96	25	58	94	33	75	8	32
40	10	09	25	45	68	94	24	57	93	32	74	10	40
48	12	08	24	44	67	93	23	56	92	31	73	12	48
56	14	06	23	42	66	92	22	55	91	30	72	14	56
5 4	16	05	21	41	64	91	21	54	90	29	71	16	5 4
12	18	03	20	40	63	90	19	52	89	28	70	18	12
20	20	02	19	39	62	88	18	51	88	27	69	20	20
28	22	01	17	37	61	87	17	50	86	26	68	22	28
36	24	0.4199	16	36	59	86	16	49	85	25	67	24	36
44	26	98	15	35	58	85	15	48	84	24	66	26	44
52	28	96	13	33	57	84	14	47	83	23	65	28	52
6 0	30	95	12	32	56	83	13	46	82	22	64	30	6 0
8	32	94	10	31	54	81	11	45	81	21	63	32	8
16	34	92	09	29	53	80	10	44	80	20	63	34	16
24	36	91	08	28	52	79	09	43	79	19	62	36	24
32	38	89	06	27	51	78	08	42	78	18	61	38	32
40	40	88	05	26	49	77	07	40	77	17	60	40	40
48	42	86	04	24	48	75	06	39	76	16	59	42	48
56	44	85	02	23	47	74	05	38	75	15	58	44	56
7 4	46	84	01	22	46	73	04	37	74	14	57	46	7 4
12	48	82	00	20	44	72	02	36	73	13	56	48	12
20	50	81	0.4098	19	43	71	01	35	72	12	55	50	20
28	52	79	97	18	42	69	00	34	71	11	54	52	28
36	54	78	96	16	41	68	0.3799	33	70	10	53	54	36
44	56	77	94	15	40	67	98	32	69	09	52	56	44
52	58	75	93	14	38	66	97	31	68	08	51	58	52

P. p.

s	
1	0.25
2	0.50
3	0.75
4	1.00
5	1.25
6	1.50
7	1.75

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Logarithmos da hora

T. Z)

m s	° ′	9h 20m	9h 28m	9h 36m	9h 44m	9h 52m	10h	10h 8m	10h 16m	10h 24m	10h 32m	° ′	m s
		140°	142°	144°	146°	148°	150°	152°	154°	156°	158°		
0 0	0 0	0.3551	0.3497	0.3446	0.3398	0.3353	0.3311	0.3272	0.3236	0.3202	0.3171	0 0	0 0
8	2	50	96	45	98	53	11	71	35	02	71	2	8
16	4	49	95	44	97	52	10	71	35	01	70	4	16
24	6	48	94	44	96	51	09	70	34	01	70	6	24
32	8	47	93	43	95	51	09	70	33	00	69	8	32
40	10	46	93	42	94	50	08	69	33	0.3199	69	10	40
48	12	45	92	41	94	49	07	68	32	99	68	12	48
56	14	44	91	40	93	48	07	68	32	98	68	14	56
1 4	16	43	90	40	92	48	06	67	31	98	67	16	1 4
12	18	42	89	39	91	47	05	67	31	97	67	18	12
20	20	41	88	38	91	46	05	66	30	97	66	20	20
28	22	40	87	37	90	45	04	65	29	96	66	22	28
36	24	40	86	36	89	45	03	65	29	96	65	24	36
44	26	39	86	36	88	44	03	64	28	95	65	26	44
52	28	38	85	35	88	43	02	63	28	95	65	28	52
2 0	30	37	84	34	87	43	01	63	27	94	64	30	2 0
8	32	36	83	33	86	42	01	62	27	94	64	32	8
16	34	35	82	32	85	41	00	62	26	93	63	34	16
24	36	34	81	31	85	41	0.3299	61	25	93	63	36	24
32	38	33	80	31	84	40	99	60	25	92	62	38	32
40	40	32	80	30	83	39	98	60	24	92	62	40	40
48	42	31	79	29	82	38	97	59	24	91	61	42	48
56	44	31	78	28	82	38	97	58	23	91	61	44	56
3 4	46	30	77	27	81	37	96	58	23	90	60	46	3 4
12	48	29	76	27	80	36	95	57	22	89	60	48	12
20	50	28	75	26	79	36	95	57	21	89	59	50	20
28	52	27	75	25	79	35	94	56	21	88	59	52	28
36	54	26	74	24	78	34	93	55	20	88	58	54	36
44	56	25	73	23	77	33	93	55	20	87	58	56	44
52	58	24	72	23	76	33	92	54	19	87	57	58	52
4 0	1 0	0.3523	0.3471	0.3422	0.3376	0.3332	0.3291	0.3254	0.3219	0.3186	0.3157	1 0	4 0
8	2	22	70	21	75	31	91	53	18	86	56	2	8
16	4	22	69	20	74	31	90	52	18	85	56	4	16
24	6	21	69	19	73	30	89	52	17	85	56	6	24
32	8	20	68	19	73	29	89	51	16	84	55	8	32
40	10	19	67	18	72	29	88	51	16	84	55	10	40
48	12	18	66	17	71	28	87	50	15	83	54	12	48
56	14	17	65	16	70	27	87	49	15	83	54	14	56
5 4	16	16	64	16	70	26	86	49	14	82	53	16	5 4
12	18	15	64	15	69	26	86	48	14	82	53	18	12
20	20	14	63	14	68	25	85	48	13	81	52	20	20
28	22	14	62	13	67	24	84	47	13	81	52	22	28
36	24	13	61	12	67	24	84	46	12	80	51	24	36
44	26	12	60	12	66	23	83	46	11	80	51	26	44
52	28	11	59	11	65	22	82	45	11	79	50	28	52
6 0	30	10	59	10	64	22	82	45	10	79	50	30	6 0
8	32	09	58	09	64	21	81	44	10	78	50	32	8
16	34	08	57	08	63	20	80	43	09	78	49	34	16
24	36	07	56	08	62	20	80	43	09	77	49	36	24
32	38	06	55	07	61	19	79	42	08	77	48	38	32
40	40	06	54	06	61	18	79	42	08	76	48	40	40
48	42	05	54	05	60	17	78	41	07	76	47	42	48
56	44	04	53	05	59	17	77	40	06	75	47	44	56
7 4	46	03	52	04	59	16	77	40	06	75	46	46	7 4
12	48	02	51	03	58	15	76	39	05	74	46	48	12
20	50	01	50	02	57	15	75	39	05	74	45	50	20
28	52	00	49	01	56	14	75	38	04	73	45	52	28
36	54	0.3499	49	01	56	13	74	38	04	73	45	54	36
44	56	99	48	00	55	13	73	37	03	72	44	56	44
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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Logarithmos da hora

m s	° ′	10h40m	10h48m	10h56m	11h4m	11h12m	11h20m	11h28m	11h36m	11h44m	11h52m	° ′	m s
		160°	162°	164°	166°	168°	170°	172°	174°	176°	178°		
0 0	0 0	0.3143	0.3118	0.3095	0.3075	0.3058	0.3043	0.3031	0.3022	0.3016	0.3012	0 0	0 0
8	2	43	17	95	75	58	43	31	22	15	12	2	8
16	4	42	17	94	74	57	43	31	22	15	11	4	16
24	6	42	17	94	74	57	43	31	22	15	11	6	24
32	8	41	16	94	74	57	42	31	22	15	11	8	32
40	10	41	16	93	74	57	42	31	22	15	11	10	40
48	12	41	15	93	73	56	42	30	21	15	11	12	48
56	14	40	15	93	73	56	42	30	21	15	11	14	56
1 4	16	40	15	92	73	56	42	30	21	15	11	16	1 4
12	18	39	14	92	72	56	41	30	21	15	11	18	12
20	20	39	14	92	72	55	41	30	21	15	11	20	20
28	22	38	13	91	72	55	41	30	21	15	11	22	28
36	24	38	13	91	72	55	41	29	21	15	11	24	36
44	26	37	13	91	71	55	41	29	21	14	11	26	44
52	28	37	12	90	71	54	40	29	20	14	11	28	52
2 0	30	37	12	90	71	54	40	29	20	14	11	30	2 0
8	32	36	12	90	70	54	40	29	20	14	11	32	8
16	34	36	11	89	70	54	40	29	20	14	11	34	16
24	36	35	11	89	70	53	40	28	20	14	11	36	24
32	38	35	10	89	69	53	39	28	20	14	11	38	32
40	40	34	10	88	69	53	39	28	20	14	11	40	40
48	42	34	10	88	69	53	39	28	20	14	11	42	48
56	44	34	09	88	69	52	39	28	19	14	11	44	56
3 4	46	33	09	87	68	52	38	28	19	14	11	46	3 4
12	48	33	08	87	68	52	38	27	19	14	11	48	12
20	50	32	08	87	68	52	38	27	19	14	11	50	20
28	52	32	08	86	67	51	38	27	19	13	11	52	28
36	54	31	07	86	67	51	38	27	19	13	11	54	36
44	56	31	07	86	67	51	37	27	19	13	11	56	44
52	58	31	07	85	67	51	37	27	19	13	11	58	52
4 0	1 0	0.3130	0.3106	0.3085	0.3066	0.3050	0.3037	0.3026	0.3019	0.3013	0.3011	1 0	4 0
8	2	30	06	85	66	50	37	26	18	13	11	2	8
16	4	29	05	84	66	50	37	26	18	13	11	4	16
24	8	29	05	84	65	50	36	26	18	13	11	6	24
32	6	29	05	84	65	49	36	26	18	13	10	8	32
40	10	28	04	83	65	49	36	26	18	13	10	10	40
48	12	28	04	83	65	49	36	26	18	13	10	12	48
56	14	27	04	83	64	49	36	25	18	13	10	14	56
5 4	16	27	03	82	64	48	35	25	18	13	10	16	5 4
12	18	26	03	82	64	48	35	25	18	13	10	18	12
20	20	26	02	82	63	48	35	25	17	13	10	20	20
28	22	26	02	81	63	48	35	25	17	13	10	22	28
36	24	25	02	81	63	47	35	25	17	12	10	24	36
44	26	25	01	81	63	47	35	25	17	12	10	26	44
52	28	24	01	80	62	47	34	24	17	12	10	28	52
6 0	30	24	01	80	62	47	34	24	17	12	10	30	6 0
8	32	24	00	80	62	47	34	24	17	12	10	32	8
16	34	23	00	79	61	46	34	24	17	12	10	34	16
24	36	23	00	79	61	46	34	24	17	12	10	36	24
32	38	22	0.3099	79	61	46	33	24	17	12	10	38	32
40	40	22	99	78	61	46	33	24	16	12	10	40	40
48	42	21	98	78	60	46	33	23	16	12	10	42	48
56	44	21	98	78	60	45	33	23	16	12	10	44	56
7 4	46	21	98	77	60	45	33	23	16	12	10	46	7 4
12	48	20	97	77	60	45	32	23	16	12	10	48	12
20	50	20	97	77	59	44	32	23	16	12	10	50	20
28	52	19	97	76	59	44	32	23	16	12	10	52	28
36	54	19	96	76	59	44	32	23	16	12	10	54	36
44	56	19	96	76	59	44	32	22	16	12	10	56	44
52	58	18	96	76	58	44	32	22	16	12	10	58	52

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TABOAS AUXILIARES

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Estima

T. I)

Rumos Pt.	Gr.	Distancia 1 Lt.	1 Ap.	2 Lt.	2 Ap.	3 Lt.	3 Ap.	4 Lt.	4 Ap.	5 Lt.	5 Ap.	6 Lt.	6 Ap.	Gr.	Rumos Pt.
	1	1.0	0.0	2.0	0.0	3.0	0.1	4.0	0.1	5.0	0.1	6.0	0.1	89	
	2	1.0	0.0	2.0	0.1	3.0	0.1	4.0	0.1	5.0	0.2	6.0	0.2	88	
1/4	..	1.0	0.0	2.0	0.1	3.0	0.1	4.0	0.2	5.0	0.2	6.0	0.3	..	7 3/4
	3	1.0	0.1	2.0	0.1	3.0	0.2	4.0	0.2	5.0	0.3	6.0	0.3	87	
	4	1.0	0.1	2.0	0.1	3.0	0.2	4.0	0.3	5.0	0.3	6.0	0.4	86	
	5	1.0	0.1	2.0	0.2	3.0	0.3	4.0	0.3	5.0	0.4	6.0	0.5	85	
1/2	..	1.0	0.1	2.0	0.2	3.0	0.3	4.0	0.4	5.0	0.5	6.0	0.6	..	7 1/2
	6	1.0	0.1	2.0	0.2	3.0	0.3	4.0	0.4	5.0	0.5	6.0	0.6	84	
	7	1.0	0.1	2.0	0.2	3.0	0.4	4.0	0.5	5.0	0.6	6.0	0.7	83	
	8	1.0	0.1	2.0	0.3	3.0	0.4	4.0	0.6	5.0	0.7	5.9	0.8	82	
3/4	..	1.0	0.1	2.0	0.3	3.0	0.4	4.0	0.6	4.9	0.7	5.9	0.9	..	7 1/4
	9	1.0	0.2	2.0	0.3	3.0	0.5	4.0	0.6	4.9	0.8	5.9	0.9	81	
	10	1.0	0.2	2.0	0.3	3.0	0.5	3.9	0.7	4.9	0.9	5.9	1.0	80	
	11	1.0	0.2	2.0	0.4	2.9	0.6	3.9	0.8	4.9	1.0	5.9	1.1	79	
1	..	1.0	0.2	2.0	0.4	2.9	0.6	3.9	0.8	4.9	1.0	5.9	1.2	..	7
	12	1.0	0.2	2.0	0.4	2.9	0.6	3.9	0.8	4.9	1.0	5.9	1.2	78	
	13	1.0	0.2	1.9	0.4	2.9	0.7	3.9	0.9	4.9	1.1	5.8	1.3	77	
	14	1.0	0.2	1.9	0.5	2.9	0.7	3.9	1.0	4.9	1.2	5.8	1.5	76	
1 1/4	..	1.0	0.2	1.9	0.5	2.9	0.7	3.9	1.0	4.9	1.2	5.8	1.5	..	6 3/4
	15	1.0	0.3	1.9	0.5	2.9	0.8	3.9	1.0	4.8	1.3	5.8	1.6	75	
	16	1.0	0.3	1.9	0.6	2.0	0.8	3.8	1.1	4.8	1.4	5.8	1.7	74	
1 1/2	..	1.0	0.3	1.9	0.6	2.9	0.9	3.8	1.2	4.8	1.5	5.7	1.7	..	6 1/2
	17	1.0	0.3	1.9	0.6	2.9	0.9	3.8	1.2	4.8	1.5	5.7	1.8	73	
	18	1.0	0.3	1.9	0.6	2.9	0.9	3.8	1.2	4.8	1.5	5.7	1.9	72	
	19	0.9	0.3	1.9	0.7	2.8	1.0	3.8	1.3	4.7	1.6	5.7	2.0	71	
1 3/4	..	0.9	0.3	1.9	0.7	2.8	1.0	3.8	1.4	4.7	1.7	5.6	2.0	..	6 1/4
	20	0.9	0.3	1.9	0.7	2.8	1.0	3.8	1.4	4.7	1.7	5.6	2.1	70	
	21	0.9	0.4	1.9	0.7	2.8	1.1	3.7	1.4	4.7	1.8	5.6	2.2	69	
	22	0.9	0.4	1.9	0.7	2.8	1.1	3.7	1.5	4.6	1.9	5.6	2.2	68	
2	..	0.9	0.4	1.8	0.8	2.8	1.2	3.7	1.5	4.6	1.9	5.5	2.3	..	6
	23	0.9	0.4	1.8	0.8	2.8	1.2	3.7	1.6	4.6	2.0	5.5	2.3	67	
	24	0.9	0.4	1.8	0.8	2.7	1.2	3.7	1.6	4.6	2.0	5.5	2.4	66	
	25	0.9	0.4	1.8	0.8	2.7	1.3	3.6	1.7	4.5	2.1	5.4	2.5	65	
2 1/4	..	0.9	0.4	1.8	0.9	2.7	1.3	3.6	1.7	4.5	2.1	5.4	2.6	..	5 3/4
	26	0.9	0.4	1.8	0.9	2.7	1.3	3.6	1.8	4.5	2.2	5.4	2.6	64	
	27	0.9	0.5	1.8	0.9	2.7	1.4	3.6	1.8	4.5	2.3	5.3	2.7	63	
	28	0.9	0.5	1.8	0.9	2.6	1.4	3.5	1.9	4.4	2.3	5.3	2.8	62	
2 1/2	..	0.9	0.5	1.8	0.9	2.6	1.4	3.5	1.9	4.4	2.4	5.3	2.8	..	5 1/2
	29	0.9	0.5	1.7	1.0	2.6	1.5	3.5	1.9	4.4	2.4	5.2	2.9	61	
	30	0.9	0.5	1.7	1.0	2.6	1.5	3.5	2.0	4.3	2.5	5.2	3.0	60	
2 3/4	..	0.9	0.5	1.7	1.0	2.6	1.5	3.4	2.1	4.3	2.6	5.1	3.1	..	5 1/4
	31	0.9	0.5	1.7	1.0	2.6	1.5	3.4	2.1	4.3	2.6	5.1	3.1	59	
	32	0.8	0.5	1.7	1.1	2.5	1.6	3.4	2.1	4.2	2.6	5.1	3.2	58	
	33	0.8	0.5	1.7	1.1	2.5	1.6	3.4	2.2	4.2	2.7	5.0	3.3	57	
3	..	0.8	0.6	1.7	1.1	2.5	1.7	3.3	2.2	4.2	2.8	5.0	3.3	..	5
	34	0.8	0.6	1.7	1.1	2.5	1.7	3.3	2.2	4.1	2.8	5.0	3.4	56	
	35	0.8	0.6	1.6	1.1	2.5	1.7	3.3	2.3	4.1	2.9	4.9	3.4	55	
	36	0.8	0.6	1.6	1.2	2.4	1.8	3.2	2.4	4.0	2.9	4.9	3.5	54	
3 1/4	..	0.8	0.6	1.6	1.2	2.4	1.8	3.2	2.4	4.0	3.0	4.8	3.6	..	4 3/4
	37	0.8	0.6	1.6	1.2	2.4	1.8	3.2	2.4	4.0	3.0	4.8	3.6	53	
	38	0.8	0.6	1.6	1.2	2.4	1.8	3.2	2.5	3.9	3.1	4.7	3.7	52	
	39	0.8	0.6	1.6	1.3	2.3	1.9	3.1	2.5	3.9	3.1	4.7	3.8	51	
3 1/2	..	0.8	0.6	1.5	1.3	2.3	1.9	3.1	2.5	3.9	3.2	4.6	3.8	..	4 1/2
	40	0.8	0.6	1.5	1.3	2.3	1.9	3.1	2.6	3.8	3.2	4.6	3.9	50	
	41	0.8	0.7	1.5	1.3	2.3	2.0	3.0	2.6	3.8	3.3	4.5	3.9	49	
	42	0.7	0.7	1.5	1.3	2.2	2.0	3.0	2.7	3.7	3.3	4.5	4.0	48	
3 3/4	..	0.7	0.7	1.5	1.3	2.2	2.0	3.0	2.7	3.7	3.4	4.4	4.0	..	4 1/4
	43	0.7	0.7	1.5	1.4	2.2	2.0	2.9	2.7	3.7	3.4	4.4	4.1	47	
	44	0.7	0.7	1.4	1.4	2.2	2.1	2.9	2.8	3.6	3.5	4.3	4.2	46	
4	45	0.7	0.7	1.4	1.4	2.1	2.1	2.8	2.8	3.5	3.5	4.2	4.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		1		2		3		4		5		6			Rumos

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Rumos Pt.	Gr.	Distancia 7 Lt.	7 Ap.	8 Lt.	8 Ap.	9 Lt.	9 Ap.	10 Lt.	10 Ap.	11 Lt.	11 Ap.	12 Lt.	12 Ap.	Rumos Gr.	Pt.
	1	7.0	0.1	8.0	0.1	9.0	0.2	10.0	0.2	11.0	0.2	12.0	0.2	89	
	2	7.0	0.2	8.0	0.3	9.0	0.3	10.0	0.3	11.0	0.4	12.0	0.4	88	
1/4	..	7.0	0.3	8.0	0.4	9.0	0.4	10.0	0.5	11.0	0.5	12.0	0.6	..	7 3/4
	3	7.0	0.4	8.0	0.4	9.0	0.5	10.0	0.5	11.0	0.6	12.0	0.6	87	
	4	7.0	0.5	8.0	0.6	9.0	0.6	10.0	0.7	11.0	0.8	12.0	0.8	86	
	5	7.0	0.6	8.0	0.7	9.0	0.8	10.0	0.9	11.0	1.0	12.0	1.0	85	
1/2	..	7.0	0.7	8.0	0.8	9.0	0.9	10.0	1.0	10.9	1.1	11.9	1.2	..	7 1/2
	6	7.0	0.7	8.0	0.8	9.0	0.9	9.9	1.0	10.9	1.1	11.9	1.3	84	
	7	6.9	0.9	7.9	1.0	8.9	1.1	9.9	1.2	10.9	1.3	11.9	1.5	83	
	8	6.9	1.0	7.9	1.1	8.9	1.3	9.9	1.4	10.9	1.5	11.9	1.7	82	
3/4	..	6.9	1.0	7.9	1.2	8.9	1.3	9.9	1.5	10.9	1.6	11.9	1.8	..	7 1/4
	9	6.9	1.1	7.9	1.3	8.9	1.4	9.9	1.6	10.9	1.7	11.9	1.9	81	
	10	6.9	1.2	7.9	1.4	8.9	1.6	9.8	1.7	10.8	1.9	11.8	2.1	80	
	11	6.9	1.3	7.9	1.5	8.8	1.7	9.8	1.9	10.8	2.1	11.8	2.3	79	
1	..	6.9	1.4	7.9	1.6	8.8	1.8	9.8	2.0	10.8	2.1	11.8	2.3	..	7
	12	6.8	1.5	7.8	1.7	8.8	1.9	9.8	2.1	10.8	2.3	11.7	2.5	78	
	13	6.8	1.6	7.8	1.8	8.8	2.0	9.7	2.2	10.7	2.5	11.7	2.7	77	
	14	6.8	1.7	7.8	1.9	8.7	2.2	9.7	2.4	10.7	2.7	11.6	2.9	76	
1 1/4	..	6.8	1.7	7.8	1.9	8.7	2.2	9.7	2.4	10.7	2.7	11.6	2.9	..	6 3/4
	15	6.8	1.8	7.7	2.1	8.7	2.3	9.7	2.6	10.6	2.8	11.6	3.1	75	
	16	6.7	1.9	7.7	2.2	8.7	2.5	9.6	2.8	10.6	3.0	11.5	3.3	74	
1 1/2	..	6.7	2.0	7.7	2.3	8.6	2.6	9.6	2.9	10.5	3.2	11.5	3.5	..	6 1/2
	17	6.7	2.0	7.7	2.3	8.6	2.6	9.6	2.9	10.5	3.2	11.5	3.5	73	
	18	6.7	2.2	7.6	2.5	8.6	2.8	9.5	3.1	10.5	3.4	11.4	3.7	72	
	19	6.6	2.3	7.6	2.6	8.5	2.9	9.5	3.3	10.4	3.6	11.3	3.9	71	
1 3/4	..	6.6	2.4	7.5	2.7	8.5	3.0	9.4	3.4	10.4	3.7	11.3	4.0	..	6 1/4
	20	6.6	2.4	7.5	2.7	8.5	3.1	9.4	3.4	10.3	3.8	11.3	4.1	70	
	21	6.5	2.5	7.5	2.9	8.4	3.2	9.3	3.6	10.3	3.9	11.2	4.3	69	
	22	6.5	2.6	7.4	3.0	8.3	3.4	9.3	3.7	10.2	4.1	11.1	4.5	68	
2	..	6.5	2.7	7.4	3.1	8.3	3.4	9.2	3.8	10.2	4.2	11.1	4.6	..	6
	23	6.4	2.7	7.4	3.1	8.3	3.5	9.2	3.9	10.1	4.3	11.0	4.7	67	
	24	6.4	2.8	7.3	3.3	8.2	3.7	9.1	4.1	10.0	4.5	11.0	4.9	66	
	25	6.3	3.0	7.3	3.4	8.2	3.8	9.1	4.2	10.0	4.6	10.9	5.1	65	
2 1/4	..	6.3	3.0	7.2	3.4	8.1	3.8	9.0	4.3	9.9	4.7	10.8	5.1	..	5 3/4
	26	6.3	3.1	7.2	3.5	8.1	3.9	9.0	4.4	9.9	4.8	10.8	5.3	64	
	27	6.2	3.2	7.1	3.6	8.0	4.1	8.9	4.5	9.8	5.0	10.7	5.4	63	
	28	6.2	3.3	7.1	3.8	7.9	4.2	8.8	4.7	9.7	5.2	10.6	5.6	62	
2 1/2	..	6.2	3.3	7.1	3.8	7.9	4.2	8.8	4.7	9.7	5.2	10.6	5.7	..	5 1/2
	29	6.1	3.4	7.0	3.9	7.9	4.4	8.7	4.8	9.6	5.3	10.5	5.8	61	
	30	6.1	3.5	6.9	4.0	7.8	4.5	8.7	5.0	9.5	5.5	10.4	6.0	60	
2 3/4	..	6.0	3.6	6.9	4.1	7.7	4.6	8.6	5.1	9.4	5.7	10.3	6.2	..	5 1/4
	31	6.0	3.6	6.9	4.1	7.7	4.6	8.6	5.2	9.4	5.7	10.3	6.2	59	
	32	5.9	3.7	6.8	4.2	7.6	4.8	8.5	5.3	9.3	5.8	10.2	6.4	58	
	33	5.9	3.8	6.7	4.4	7.5	4.9	8.4	5.4	9.2	6.0	10.1	6.5	57	
3	..	5.8	3.9	6.7	4.4	7.5	5.0	8.3	5.6	9.1	6.1	10.0	6.7	..	5
	34	5.8	3.9	6.6	4.5	7.5	5.0	8.3	5.6	9.1	6.2	9.9	6.7	56	
	35	5.7	4.0	6.6	4.6	7.4	5.2	8.2	5.7	9.0	6.3	9.8	6.9	55	
	36	5.7	4.1	6.5	4.7	7.3	5.3	8.1	5.9	8.9	6.5	9.7	7.1	54	
3 1/4	..	5.6	4.2	6.4	4.8	7.2	5.4	8.0	6.0	8.8	6.6	9.6	7.1	..	4 3/4
	37	5.6	4.2	6.4	4.8	7.2	5.4	8.0	6.0	8.8	6.6	9.6	7.2	53	
	38	5.5	4.3	6.3	4.9	7.1	5.5	7.9	6.2	8.7	6.8	9.5	7.4	52	
	39	5.4	4.4	6.2	5.0	7.0	5.7	7.8	6.3	8.5	6.9	9.3	7.6	51	
3 1/2	..	5.4	4.4	6.2	5.1	7.0	5.7	7.7	6.3	8.5	7.0	9.3	7.6	..	4 1/2
	40	5.4	4.5	6.1	5.1	6.9	5.8	7.7	6.4	8.4	7.1	9.2	7.7	50	
	41	5.3	4.6	6.0	5.2	6.8	5.9	7.5	6.6	8.3	7.2	9.1	7.9	49	
	42	5.2	4.7	5.9	5.4	6.7	6.0	7.4	6.7	8.2	7.4	8.9	8.0	48	
3 3/4	..	5.2	4.7	5.9	5.4	6.7	6.0	7.4	6.7	8.2	7.4	8.9	8.1	..	4 1/4
	43	5.1	4.8	5.9	5.5	6.6	6.1	7.3	6.8	8.0	7.5	8.8	8.2	47	
	44	5.0	4.9	5.8	5.6	6.5	6.3	7.2	6.9	7.9	7.6	8.6	8.3	46	
4	45	4.9	4.9	5.7	5.7	6.4	6.4	7.1	7.1	7.8	7.8	8.5	8.5	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		7		8		9		10		11		12			Rumos

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Rumos Pt.	Rumos Gr.	Distancia 13 Lt.	13 Ap.	14 Lt.	14 Ap.	15 Lt.	15 Ap.	16 Lt.	16 Ap.	17 Lt.	17 Ap.	18 Lt.	18 Ap.	Rumos Gr.	Rumos Pt.
	1	13.0	0.2	14.0	0.2	15.0	0.3	16.0	0.3	17.0	0.3	18.0	0.3	89	
$\frac{1}{4}$	2	13.0	0.5	14.0	0.5	15.0	0.5	16.0	0.6	17.0	0.6	18.0	0.6	88	
	..	13.0	0.6	14.0	0.7	15.0	0.7	16.0	0.8	17.0	0.8	18.0	0.9	..	$7\frac{3}{4}$
	3	13.0	0.7	14.0	0.7	15.0	0.8	16.0	0.8	17.0	0.9	18.0	0.9	87	
	4	13.0	0.9	14.0	1.0	15.0	1.0	16.0	1.1	17.0	1.2	18.0	1.3	86	
$\frac{1}{2}$	5	13.0	1.1	13.9	1.2	14.9	1.3	15.9	1.4	16.9	1.5	17.9	1.6	85	
	..	12.9	1.3	13.9	1.4	14.9	1.5	15.9	1.6	16.9	1.7	17.9	1.8	..	$7\frac{1}{2}$
	6	12.9	1.4	13.9	1.5	14.9	1.6	15.9	1.7	16.9	1.8	17.9	1.9	84	
	7	12.9	1.6	13.9	1.7	14.9	1.8	15.9	1.9	16.9	2.1	17.9	2.2	83	
	8	12.9	1.8	13.9	1.9	14.9	2.1	15.8	2.2	16.8	2.4	17.8	2.5	82	
$\frac{3}{4}$	..	12.9	1.9	13.8	2.1	14.8	2.2	15.8	2.3	16.8	2.5	17.8	2.6	..	$7\frac{1}{4}$
	9	12.8	2.0	13.8	2.2	14.8	2.3	15.8	2.5	16.8	2.7	17.8	2.8	81	
	10	12.8	2.3	13.8	2.4	14.8	2.6	15.8	2.8	16.7	3.0	17.7	3.1	80	
	11	12.8	2.5	13.7	2.7	14.7	2.9	15.7	3.1	16.7	3.2	17.7	3.4	79	
1	..	12.7	2.5	13.7	2.7	14.7	2.9	15.7	3.1	16.7	3.3	17.7	3.5	..	7
	12	12.7	2.7	13.7	2.9	14.7	3.1	15.7	3.3	16.6	3.5	17.6	3.7	78	
	13	12.7	2.9	13.6	3.1	14.6	3.4	15.6	3.6	16.6	3.8	17.5	4.0	77	
	14	12.6	3.1	13.6	3.4	14.6	3.6	15.5	3.9	16.5	4.1	17.5	4.4	76	
$1\frac{1}{4}$	..	12.6	3.2	13.6	3.4	14.6	3.6	15.5	3.9	16.5	4.1	17.5	4.4	..	$6\frac{3}{4}$
	15	12.6	3.4	13.5	3.6	14.5	3.9	15.5	4.1	16.4	4.4	17.4	4.7	75	
	16	12.5	3.6	13.5	3.9	14.4	4.1	15.4	4.4	16.3	4.7	17.3	5.0	74	
$1\frac{1}{2}$	..	12.4	3.8	13.4	4.1	14.4	4.4	15.3	4.6	16.3	4.9	17.2	5.2	..	$6\frac{1}{2}$
	17	12.4	3.8	13.4	4.1	14.3	4.4	15.4	4.7	16.3	5.0	17.2	5.3	73	
	18	12.4	4.0	13.3	4.3	14.3	4.6	15.2	4.9	16.2	5.3	17.1	5.6	72	
	19	12.3	4.2	13.2	4.6	14.2	4.9	15.1	5.2	16.1	5.5	17.0	5.9	71	
$1\frac{3}{4}$	..	12.2	4.4	13.2	4.7	14.1	5.1	15.1	5.4	16.0	5.7	17.0	6.1	..	$6\frac{1}{4}$
	20	12.2	4.4	13.2	4.8	14.1	5.1	15.0	5.5	16.0	5.8	16.9	6.2	70	
	21	12.1	4.7	13.1	5.0	14.0	5.4	14.9	5.7	15.9	6.1	16.8	6.5	69	
	22	12.1	4.9	13.0	5.2	13.9	5.6	14.8	6.0	15.8	6.4	16.7	6.7	68	
2	..	12.0	5.0	12.9	5.4	13.9	5.7	14.8	6.1	15.7	6.5	16.6	6.9	..	6
	23	12.0	5.1	12.9	5.5	13.8	5.9	14.7	6.3	15.6	6.6	16.6	7.0	67	
	24	11.9	5.3	12.8	5.7	13.7	6.1	14.6	6.5	15.5	6.9	16.4	7.3	66	
	25	11.8	5.5	12.7	5.9	13.6	6.3	14.5	6.8	15.4	7.2	16.3	7.6	65	
$2\frac{1}{4}$	..	11.8	5.6	12.7	6.0	13.6	6.4	14.5	6.8	15.4	7.3	16.3	7.7	..	$5\frac{3}{4}$
	26	11.7	5.7	12.6	6.1	13.5	6.6	14.4	7.0	15.3	7.5	16.2	7.9	64	
	27	11.6	5.9	12.5	6.4	13.4	6.8	14.3	7.3	15.1	7.7	16.0	8.2	63	
	28	11.5	6.1	12.4	6.6	13.2	7.0	14.1	7.5	15.0	8.0	15.9	8.5	62	
$2\frac{1}{2}$	..	11.5	6.1	12.3	6.6	13.2	7.1	14.1	7.5	15.0	8.0	15.9	8.5	..	$5\frac{1}{2}$
	29	11.4	6.3	12.2	6.8	13.1	7.3	14.0	7.8	14.9	8.2	15.7	8.7	61	
	30	11.3	6.5	12.1	7.0	13.0	7.5	13.9	8.0	14.7	8.5	15.6	9.0	60	
$2\frac{3}{4}$	..	11.2	6.7	12.0	7.2	12.9	7.7	13.7	8.2	14.6	8.7	15.4	9.3	..	$5\frac{1}{4}$
	31	11.1	6.7	12.0	7.2	12.9	7.7	13.7	8.2	14.6	8.8	15.4	9.3	59	
	32	11.0	6.9	11.9	7.4	12.7	7.9	13.6	8.5	14.4	9.0	15.5	9.5	58	
	33	10.9	7.1	11.7	7.6	12.6	8.2	13.4	8.7	14.3	9.3	15.1	9.8	57	
3	..	10.8	7.2	11.6	7.8	12.5	8.3	13.3	8.9	14.1	9.4	15.0	10.0	..	5
	34	10.8	7.3	11.6	7.8	12.4	8.4	13.3	8.9	14.1	9.5	14.9	10.1	56	
	35	10.6	7.5	11.5	8.0	12.3	8.6	13.1	9.2	13.9	9.8	14.7	10.3	55	
	36	10.5	7.6	11.3	8.2	12.1	8.8	12.9	9.4	13.8	10.0	14.6	10.6	54	
$3\frac{1}{4}$	..	10.4	7.7	11.2	8.3	12.0	8.9	12.9	9.5	13.7	10.1	14.5	10.7	..	$4\frac{3}{4}$
	37	10.4	7.8	11.2	8.4	12.0	9.0	12.8	9.6	13.6	10.2	14.4	10.8	53	
	38	10.2	8.0	11.0	8.6	11.8	9.2	12.6	9.9	13.4	10.5	14.2	11.1	52	
$3\frac{1}{2}$	39	10.1	8.2	10.9	8.8	11.7	9.4	12.4	10.1	13.2	10.7	14.0	11.3	51	
	..	10.0	8.2	10.8	8.9	11.6	9.5	12.4	10.1	13.1	10.8	13.9	11.4	.	$4\frac{1}{2}$
	40	10.0	8.4	10.7	9.0	11.5	9.6	12.3	10.3	13.0	10.9	13.8	11.6	50	
	41	9.8	8.5	10.6	9.2	11.3	9.8	12.1	10.5	12.8	11.2	13.6	11.8	49	
$3\frac{3}{4}$	42	9.7	8.7	10.4	9.4	11.1	10.0	11.9	10.7	12.6	11.4	13.4	12.0	48	
	..	9.6	8.7	10.4	9.4	11.1	10.1	11.9	10.7	12.6	11.4	13.3	12.1	.	$4\frac{1}{4}$
	43	9.5	8.9	10.2	9.5	11.0	10.2	11.7	10.9	12.4	11.6	13.2	12.3	47	
	44	9.4	9.0	10.1	9.7	10.8	10.4	11.5	11.1	12.2	11.8	12.9	12.5	46	
4	45	9.2	9.2	9.9	9.9	10.6	10.6	11.3	11.3	12.0	12.0	12.7	12.7	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		13		14		15		16		17		18		Rumos	

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Rumos Pt.	Gr.	Distancia 19 Lt.	19 Ap.	20 Lt.	20 Ap.	21 Lt.	21 Ap.	22 Lt.	22 Ap.	23 Lt.	23 Ap.	24 Lt.	24 Ap.	Rumos Gr.	Pt.
	1	19.0	0.3	20.0	0.3	21.0	0.4	22.0	0.4	23.0	0.4	24.0	0.4	89	
	2	19.0	0.7	20.0	0.7	21.0	0.7	22.0	0.8	23.0	0.8	24.0	0.8	88	
1/4	..	19.0	0.9	20.0	1.0	21.0	1.0	22.0	1.1	23.0	1.1	24.0	1.2	..	7 3/4
	3	19.0	1.0	20.0	1.0	21.0	1.1	22.0	1.2	23.0	1.2	24.0	1.3	87	
	4	19.0	1.3	20.0	1.4	20.9	1 5	21.9	1.5	22.9	1.6	23.9	1.7	86	
	5	18.9	1.7	19.9	1.7	20.9	1.8	21.9	1.9	22.9	2.0	23.9	2.1	85	
1/2	..	18.9	1.9	19.9	2.0	20.9	2.1	21.9	2.2	22.9	2.3	23.9	2.4	.	7 1/2
	6	18.9	2.0	19.9	2.1	20.9	2.2	21.9	2.3	22.9	2.4	23.9	2.5	84	
	7	18.9	2.3	19.9	2.4	20.8	2.6	21.8	2.7	22.8	2.8	23.8	2.9	83	
	8	18.8	2.6	19.8	2.8	20.8	2.9	21.8	3.1	22.8	3.2	23.8	3.3	82	
3/4	..	18.8	2.8	19.8	2.9	20.8	3.1	21.8	3.2	22.7	3.4	23.7	3.5	..	7 1/4
	9	18.8	3.0	19.8	3.1	26.7	3.3	21.7	3.4	22.7	3.6	23.7	3.8	81	
	10	18.7	3.3	19.7	3.5	20.7	3.6	21.7	3.8	22.7	4.0	23.6	4.2	80	
	11	18.7	3.6	19 6	3.8	20.6	4.0	21.6	4.2	22.6	4.4	23.6	4.6	79	
1	..	18.6	3.7	19.6	3.9	20.6	4.1	21.6	4.3	22.6	4.5	23.5	4.7	..	7
	12	18.6	4.0	19.6	4.2	20.5	4.4	21.5	4.6	22.5	4.8	23.5	5.0	78	
	13	18.5	4.3	19.5	4.5	20.5	4.7	21.4	4.9	22.4	5.2	23.4	5.4	77	
	14	18.4	4.6	19.4	4.8	20.4	5.1	21.3	5.3	22.3	5.6	23.3	5.8	76	
1 1/4	..	18.4	4.6	19.4	4.9	20.4	5.1	21.3	5.3	22.3	5.6	23.3	5.8	..	6 3/4
	15	18.4	4.9	19.3	5.2	20.3	5.4	21.3	5.7	22.2	6.0	23.2	6.2	75	
	16	18.3	5.2	19.2	5.5	20.2	5.8	21.1	6.1	22.1	6.3	23.1	6.6	74	
1 1/2	..	18.2	5.5	19.1	5.8	20.1	6.1	21.1	6.4	22.0	6.7	23.0	7.0	..	6 1/2
	17	18.2	5.6	19.1	5.8	20.1	6.1	21.0	6.4	22.0	6.7	23.0	7.6	73	
	18	18.1	5.9	19.0	6.2	20.0	6.5	20.9	6.8	21.9	7.1	22.8	7.4	72	
	19	18.0	6.2	18.9	6.5	19.9	6.8	20.8	7.2	21.7	7.5	22.7	7.8	71	
1 3/4	..	17.9	6.4	18 8	6.7	19.8	7.1	20.7	7.4	21.7	7.7	22.6	8.1	..	6 1/4
	20	17.9	6.5	18.8	6.8	19.7	7.2	20.7	7.5	21.6	7.9	22.6	8.2	70	
	21	17.7	6.8	18.7	7.2	19.6	7.5	20.5	7.9	21.5	8.2	22.4	8.6	69	
	22	17.6	7.1	18.5	7.5	19.5	7.9	20.4	8.2	21.3	8.6	22.3	9.0	68	
2	..	17.6	7.3	18.5	7.7	19.4	8.0	20.3	8.4	21.3	8.8	22.2	9.2	..	6
	23	17.5	7.4	18.4	7.8	19.3	8.2	20.3	8.6	21.2	9.0	22.1	9.4	67	
	24	17.4	7.7	18.3	8.1	19.2	8.5	20.1	8.9	21.0	9.4	21.9	9.8	66	
	25	17.2	8.0	18.1	8.5	1.90	8.9	19.9	9.3	20.8	9.7	21.8	10.1	65	
2 1/4	..	17.2	8.1	18.1	8.6	19.0	9.0	19.9	9.4	20.8	9.8	21.7	10.3	..	5 3/4
	26	17.1	8.3	18.0	8.8	18.9	9.2	19.8	9.6	20.7	10.1	21.6	10.5	64	
	27	16.9	8.6	17.8	9.1	18.7	9.5	19.6	10.0	20.5	10.4	21.4	10.9	63	
	28	16.8	8.9	17.7	9.4	18.5	9.9	19.4	10.3	20.3	10.8	21.2	11.3	62	
2 1/2	..	16.8	9.0	17.6	9.4	18.5	9.9	19.4	10.4	20.3	10.8	21.2	11.3	..	5 1/2
	29	16.6	9.2	17.5	9.7	18.4	10.2	19.2	10.7	20.1	11.2	21.0	11.6	61	
	30	16.5	9.5	17.3	10.0	18.2	10.5	19.1	11.0	19.9	11.5	20.8	12.0	60	
2 3/4	..	16.3	9.8	17.2	10.3	18.0	10.8	18.9	11.3	19.7	11.8	20.6	12.3	..	5 1/4
	31	16.3	9.8	17.1	10.3	18.0	10.8	18.9	11.3	19.7	11.8	20.6	12.4	59	
	32	16.1	10.1	17.0	10.6	17.8	11.1	18.7	11.7	19.5	12.2	20.4	12.7	58	
	33	15.9	10.3	16.8	10.9	17.6	11.4	18.5	12.0	19.3	12.5	20.1	13.1	57	
3	..	15.8	10.6	16.6	11.1	17.5	11.7	18.3	12.2	19.1	12.8	20.0	13.3	..	5
	34	15.8	10.6	16.6	11.2	17.4	11.7	18.2	12.3	19.1	12.9	19.9	13.4	56	
	35	15.6	10.9	16.4	11.5	17.2	12.0	18.0	12.6	18.8	13.2	19.7	13.8	55	
	36	15.4	11.2	16.2	11.8	17.0	12.3	17.8	12.9	18.6	13.5	19.4	14.1	54	
3 1/4	..	15.3	11.3	16.1	11.9	16.9	12.5	17.7	13.1	18.5	13.7	19.3	14.3	..	4 3/4
	37	15.2	11.4	16.0	12.0	16.8	12.6	17.6	13.2	18.4	13.8	19.2	14.4	53	
	38	15.0	11.7	15.8	12.3	16.5	12.9	17.3	13.5	18.1	14.2	18.9	14.8	52	
	39	14.8	12.0	15.5	12.6	16.3	13.2	17.1	13.8	17.9	14.5	18 7	15.1	51	
3 1/2	..	14.7	12.0	15.3	12.7	16.2	13.3	17.0	14.0	17.8	14.6	18.5	15.2	..	4 1/2
	40	14.6	12.2	15.3	12.9	16.1	13.5	16.9	14.1	17.6	14.8	18.4	15.4	50	
	41	14.3	12.5	15.1	13.1	15.8	13.8	16.6	14.4	17.4	15.1	18.1	15.7	49	
	42	14.1	12.7	14.9	13.4	15.6	14.1	16.3	14.7	17.1	15.4	17.8	16.1	48	
3 3/4	..	14.1	12.8	14.8	13.4	15.6	14.1	16.3	14.8	17.0	15.4	17.8	16.1	..	4 1/4
	43	13.9	13.0	14.6	13.6	15.4	14.3	16.1	15.0	16.8	15.7	17.6	16.4	47	
	44	13.7	13.2	14.4	13.9	15.1	14.6	15.8	15.3	16.5	16.0	17.3	16.7	46	
4	45	13.4	13.4	14.1	14.1	14.8	14.8	15.6	15.6	16.3	16.3	17.0	17.0	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		19		20		21		22		23		24			Rumos

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Rumos		Distancia												Rumos	
		25		26		27		28		29		30			
Pt.	Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
	1	25.0	0.4	26.0	0.5	27.0	0.5	28.0	0.5	29.0	0.5	30.0	0.5	89	
	2	25.0	0.9	26.0	0.9	27.0	0.9	28.0	1.0	29.0	1.0	30.0	1.0	88	
1/4	..	25.0	1.2	26.0	1.3	27.0	1.3	28.0	1.4	29.0	1.4	30.0	1.5	..	7 3/4
	3	25.0	1.3	26.0	1.4	27.0	1.4	28.0	1.5	29.0	1.5	30.0	1.6	87	
	4	24.9	1.7	25.9	1.8	26.9	1.9	27.9	2.0	28.9	2.0	29.9	2.1	86	
	5	24.9	2.2	25.9	2.3	26.9	2.4	27.9	2.4	28.9	2.5	29.9	2.6	85	
1/2	..	24.9	2.4	25.9	2.5	26.9	2.6	27.9	2.7	28.9	2.8	29.9	2.9	..	7 1/2
	6	24.9	2.6	25.9	2.7	26.9	2.8	27.8	2.9	28.8	3.0	29.8	3.1	84	
	7	24.8	3.0	25.8	3.2	26.8	3.3	27.8	3.4	28.8	3.5	29.8	3.7	83	
	8	24.8	3.5	25.7	3.6	26.7	3.8	27.7	3.9	28.7	4.0	29.7	4.2	82	
3/4	..	24.7	3.7	25.7	3.8	26.7	4.0	27.7	4.1	28.7	4.3	29.7	4.4	..	7 1/4
	9	24.7	3.9	25.7	4.1	26.7	4.2	27.7	4.4	28.6	4.5	29.6	4.7	81	
	10	24.6	4.3	25.6	4.5	26.6	4.7	27.6	4.9	28.6	5.0	29.5	5.2	80	
	11	24.5	4.8	25.5	5.0	26.5	5.2	27.5	5.3	28.5	5.5	29.4	5.7	79	
1	..	24.5	4.9	25.5	5.1	26.5	5.3	27.5	5.5	28.4	5.7	29.4	5.9	..	7
	12	24.5	5.2	25.4	5.4	26.4	5.6	27.4	5.8	28.4	6.0	29.3	6.2	78	
	13	24.4	5.6	25.3	5.8	26.3	6.1	27.3	6.3	28.3	6.5	29.2	6.7	77	
	14	24.3	6.0	25.2	6.3	26.2	6.5	27.2	6.8	28.1	7.0	29.1	7.3	76	
1 1/4	..	24.3	6.1	25.2	6.3	26.2	6.6	27.2	6.8	28.1	7.0	29.1	7.3	..	6 3/4
	15	24.1	6.5	25.1	6.7	26.1	7.0	27.0	7.2	28.0	7.5	29.0	7.8	75	
	16	24.0	6.9	25.0	7.2	26.0	7.4	26.9	7.7	27.9	8.0	28.8	8.3	74	
1 1/2	..	23.9	7.3	24.9	7.5	25.8	7.8	26.8	8.1	27.8	8.4	28.7	8.7	..	6 1/2
	17	23.9	7.3	24.9	7.6	25.8	7.9	26.8	8.2	27.7	8.5	28.7	8.8	73	
	18	23.8	7.7	24.7	8.0	25.7	8.3	26.6	8.7	27.6	9.0	28.5	9.3	72	
	19	23.6	8.1	24.6	8.5	25.5	8.8	26.5	9.1	27.4	9.4	28.4	9.8	71	
1 3/4	..	23.5	8.4	24.5	8.8	25.4	9.1	26.4	9.4	27.3	9.8	28.2	10.1	..	6 1/4
	20	23.5	8.6	24.4	8.9	25.4	9.2	26.3	9.6	27.3	9.9	28.2	10.3	70	
	21	23.3	9.0	24.3	9.3	25.2	9.7	26.1	10.0	27.1	10.4	28.0	10.8	69	
	22	23.2	9.4	24.1	9.7	25.0	10.1	26.0	10.5	26.9	10.9	27.8	11.2	68	
2	..	23.1	9.6	24.0	10.0	24.9	10.3	25.9	10.7	26.8	11.1	27.7	11.5	..	6
	23	23.0	9.8	23.9	10.2	24.9	10.5	25.8	10.9	26.7	11.3	27.6	11.7	67	
	24	22.8	10.2	23.8	10.6	24.7	11.0	25.6	11.4	26.5	11.8	27.4	12.2	66	
	25	22.7	10.6	23.6	11.0	24.5	11.4	25.4	11.8	26.3	12.3	27.2	12.7	65	
2 1/4	..	22.6	10.7	23.5	11.1	24.4	11.5	25.3	12.0	26.2	12.4	27.1	12.8	..	5 3/4
	26	22.5	11.0	23.4	11.4	24.3	11.8	25.2	12.3	26.1	12.7	27.0	13.2	64	
	27	22.3	11.3	23.2	11.8	24.1	12.3	24.9	12.7	25.8	13.2	26.7	13.6	63	
	28	22.1	11.7	23.0	12.2	23.8	12.7	24.7	13.1	25.6	13.6	26.5	14.1	62	
2 1/2	..	22.1	11.8	22.9	12.3	23.8	12.7	24.7	13.2	25.6	13.7	26.5	14.1	..	5 1/2
	29	21.9	12.1	22.7	12.6	23.6	13.1	24.5	13.6	25.4	14.1	26.2	14.5	61	
	30	21.7	12.5	22.5	13.0	23.4	13.5	24.2	14.0	25.1	14.5	26.0	15.0	60	
2 3/4	..	21.4	12.9	22.3	13.4	23.2	13.9	24.0	14.4	24.9	14.9	25.7	15.4	..	5 1/4
	31	21.4	12.9	22.3	13.4	23.1	13.9	24.0	14.0	24.9	14.9	25.7	15.5	59	
	32	21.2	13.2	22.0	13.8	22.9	14.3	23.7	14.8	24.6	15.4	25.4	15.9	58	
	33	21.1	13.6	21.8	14.2	22.6	14.7	23.5	15.2	24.3	15.8	25.2	16.3	57	
3	..	20.8	13.9	21.6	14.4	22.4	15.0	23.3	15.6	24.1	16.1	24.9	16.7	..	5
	34	20.7	14.0	21.6	14.5	22.4	15.1	23.2	15.7	24.0	16.2	24.9	16.8	56	
	35	20.5	14.3	21.3	14.9	22.1	15.5	22.9	16.1	23.8	16.6	24.6	17.2	55	
	36	20.2	14.7	21.0	15.3	21.8	15.9	22.7	16.5	23.5	17.0	24.3	17.6	54	
3 1/4	..	20.1	14.9	20.9	15.5	21.7	16.1	22.5	16.7	23.3	17.3	24.1	17.9	..	4 3/4
	37	20.0	15.0	20.8	15.6	21.6	16.2	22.4	16.9	23.2	17.5	24.0	18.1	53	
	38	19.7	15.4	20.5	16.0	21.3	16.6	22.1	17.2	22.9	17.9	23.6	18.5	52	
3 1/2	39	19.4	15.7	20.2	16.4	21.0	17.0	21.8	17.6	22.5	18.3	23.3	18.9	51	
	..	19.3	15.9	20.1	16.5	20.9	17.1	21.6	17.8	22.4	18.4	23.2	19.0	.	4 1/2
	40	19.2	16.1	19.9	16.7	20.7	17.4	21.4	18.0	22.2	18.6	23.0	19.3	50	
	41	18.9	16.4	19.6	17.1	20.4	17.7	21.1	18.4	21.9	19.0	22.6	19.7	49	
3 3/4	42	18.6	16.7	19.3	17.4	20.1	18.1	20.8	18.7	21.6	19.4	22.3	20.1	48	
	..	18.5	16.8	19.3	17.5	20.0	18.1	20.7	18.8	21.5	19.5	22.2	20.1	..	4 1/4
	43	18.3	17.0	19.0	17.7	19.7	18.4	20.5	19.1	21.2	19.8	21.9	20.5	47	
	44	18.0	17.4	18.7	18.1	19.4	18.8	20.1	19.5	20.9	20.1	21.6	20.8	46	
4	45	17.7	17.7	18.4	18.4	19.1	19.1	19.8	19.8	20.5	20.5	21.2	21.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		25		26		27		28		29		30			Rumos

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Rumos Pt.	Gr.	Distancia 31 Lt.	31 Ap.	32 Lt.	32 Ap.	33 Lt.	33 Ap.	34 Lt.	34 Ap.	35 Lt.	35 Ap.	36 Lt.	36 Ap.	Gr.	Rumos Pt.
	1	31.0	0.5	32.0	0.6	33.0	0.6	34.0	0.6	35.0	0.6	36.0	0.6	89	
	2	31.0	1.1	32.0	1.1	33.0	1.2	34.0	1.2	35.0	1.2	36.0	1.3	88	
1/4	..	31.0	1.5	32.0	1.6	33.0	1.6	34.0	1.7	35.0	1.7	36.0	1.8	..	7 3/4
	3	31.0	1.6	32.0	1.7	33.0	1.7	34.0	1.8	35.0	1.8	36.0	1.9	87	
	4	30.9	2.2	31.9	2.2	32.9	2.3	33.9	2.4	34.9	2.4	35.9	2.5	86	
	5	30.9	2.7	31.9	2.8	32.9	2.9	33.9	3.0	34.9	3.1	35.9	3.1	85	
1/2	..	30.9	3.0	31.8	3.1	32.8	3.2	33.8	3.3	34.8	3.4	35.8	3.5	..	7 1/2
	6	30.8	3.2	31.8	3.3	32.8	3.4	33.8	3.6	34.8	3.7	35.8	3.8	84	
	7	30.8	3.8	31.8	3.9	32.8	4.0	33.7	4.1	34.7	4.3	35.7	4.4	83	
	8	30.7	4.3	31.7	4.5	32.7	4.6	33.7	4.7	34.7	4.9	35.6	5.0	82	
3/4	..	30.7	4.5	31.7	4.7	32.6	4.8	33.6	5.0	34.6	5.1	35.6	5.3	..	7 1/4
	9	30.6	4.8	31.6	5.0	32.6	5.2	33.6	5.3	34.6	5.3	35.6	5.6	81	
	10	30.5	5.4	31.5	5.6	32.5	5.7	33.5	5.9	34.5	6.1	35.5	6.3	80	
	11	30.4	5.9	31.4	6.1	32.4	6.3	33.4	6.5	34.4	6.7	35.3	6.9	79	
1	.	30.4	6.0	31.4	6.2	32.4	6.4	33.3	6.6	34.3	6.8	35.3	7.0	.	7
	12	30.3	6.4	31.3	6.7	32.3	6.9	33.3	7.1	34.2	7.3	35.2	7.5	78	
	13	30.2	7.0	31.2	7.2	32.2	7.4	33.1	7.6	34.1	7.9	35.1	8.1	77	
	14	30.1	7.5	31.0	7.7	32.0	8.0	33.0	8.2	34.0	8.5	34.9	8.7	76	
1/4	..	30.1	7.5	31.0	7.8	32.0	8.0	33.0	8.3	34.0	8.5	34.9	8.7	..	6 3/4
	15	29.9	8.0	30.9	8.3	31.9	8.5	32.8	8.8	33.8	9.1	34.8	9.3	75	
	16	29.8	8.5	30.8	8.8	31.7	9.1	32.7	9.4	33.6	9.6	34.6	9.9	74	
1/2	..	29.7	9.0	30.6	9.3	31.6	9.6	32.5	9.9	33.5	10.2	34.5	10.4	..	6 1/2
	17	29.6	9.1	30.6	9.4	31.6	9.6	32.5	9.9	33.5	10.2	34.4	10.5	73	
	18	29.5	9.6	30.4	9.9	31.4	10.2	32.3	10.5	33.3	10.8	34.2	11.1	72	
	19	29.3	10.1	30.3	10.4	31.2	10.7	32.1	11.1	33.1	11.4	34.0	11.7	71	
3/4	..	29.2	10.4	30.1	10.8	31.1	11.1	32.0	11.5	33.0	11.8	33.9	12.1	..	6 1/4
	20	29.1	10.6	30.1	10.9	31.0	11.3	31.9	11.6	32.9	12.0	33.8	12.3	70	
	21	28.9	11.1	29.9	11.5	30.8	11.8	31.7	12.2	32.7	12.5	33.6	12.9	69	
	22	28.7	11.6	29.7	12.0	30.6	12.4	31.5	12.7	32.5	13.1	33.4	13.5	68	
2	..	28.6	11.9	29.6	12.2	30.5	12.6	31.4	13.0	32.3	13.4	33.3	13.8	..	6
	23	28.5	12.1	29.5	12.5	30.4	12.9	31.3	13.3	32.2	13.7	33.1	14.1	67	
	24	28.3	12.6	29.2	13.0	30.1	13.4	31.1	13.8	32.0	14.2	32.9	14.6	66	
	25	28.1	13.1	29.0	13.5	29.9	13.9	30.8	14.4	31.7	14.8	32.6	15.2	65	
1/4	..	28.0	13.3	28.9	13.7	29.8	14.1	30.7	14.5	31.6	15.0	32.5	15.4	..	5 3/4
	26	27.9	13.6	28.8	14.0	29.7	14.5	30.6	14.9	31.5	15.3	32.4	15.8	64	
	27	27.6	14.1	28.5	14.5	29.4	15.0	30.3	15.4	31.2	15.9	32.1	16.3	63	
	28	27.4	14.6	28.3	15.0	29.1	15.5	30.0	16.0	30.9	16.4	31.8	16.9	62	
1/2	..	27.3	14.6	28.2	15.1	29.1	15.6	30.0	16.0	30.9	16.5	31.8	17.0	..	5 1/2
	29	27.1	15.0	28.0	15.5	28.9	16.0	29.7	16.5	30.6	17.0	31.5	17.5	61	
	30	26.8	15.5	27.7	16.0	28.6	16.5	29.4	17.0	30.3	17.5	31.2	18.0	60	
3/4	..	26.6	15.9	27.4	16.4	28.3	17.0	29.2	17.5	30.0	18.0	30.9	18.5	..	5 1/4
	31	26.6	16.0	27.4	16.5	28.3	17.0	29.1	17.5	30.0	18.0	30.9	18.5	59	
	32	26.3	16.4	27.1	17.0	28.0	17.5	28.8	18.0	29.7	18.5	30.5	19.1	58	
	33	26.0	16.9	26.8	17.4	27.7	18.0	28.5	18.5	29.4	19.1	30.2	19.6	57	
3	..	25.8	17.2	26.6	17.8	27.4	18.3	28.3	18.9	29.1	19.4	29.9	20.0	..	5
	34	25.7	17.3	26.5	17.9	27.4	18.5	28.2	19.0	29.0	19.6	29.8	20.1	56	
	35	25.4	17.8	26.2	18.4	27.0	18.9	27.9	19.5	28.7	20.1	29.5	20.6	55	
	36	25.1	18.2	25.9	18.8	26.7	19.4	27.5	20.0	28.3	20.6	29.1	21.2	54	
1/4	..	24.9	18.5	25.7	19.1	26.5	19.7	27.3	20.3	28.1	20.9	28.9	21.4	..	4 3/4
	37	24.8	18.7	25.6	19.3	26.4	19.9	27.2	20.5	28.0	21.1	28.8	21.7	53	
	38	24.4	19.1	25.2	19.7	26.0	20.3	26.8	20.9	27.6	21.5	28.4	22.2	52	
	39	24.1	19.5	24.9	20.1	25.6	20.8	26.4	21.4	27.2	22.0	28.0	22.7	51	
1/2	..	24.0	19.7	24.7	20.3	25.5	20.9	26.3	21.6	27.1	22.2	27.8	22.8	..	4 1/2
	40	23.7	19.9	24.5	20.6	25.3	21.2	26.0	21.9	26.8	22.5	27.6	23.1	50	
	41	23.4	20.3	24.2	21.0	24.9	21.6	25.7	22.3	26.4	23.0	27.2	23.6	49	
	42	23.0	20.7	23.8	21.4	24.5	21.1	25.3	22.8	26.0	23.4	26.8	24.1	48	
3/4	..	23.0	20.8	23.7	21.5	24.4	22.2	25.2	22.8	25.9	23.5	26.7	24.2	..	4 1/4
	43	22.7	21.1	23.4	21.8	24.1	22.5	24.9	23.2	25.6	23.9	26.3	24.6	47	
	44	22.3	21.5	23.0	22.2	23.7	22.9	24.5	23.6	25.2	24.3	25.9	25.0	46	
4	45	21.9	21.9	22.6	22.6	23.3	23.3	24.0	24.0	24.7	24.7	25.5	25.5	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		31		32		33		34		35		36			Rumos

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Rumos		Distancia												Rumos	
		37		38		39		40		41		42			
Pt.	Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
	1	37.0	0.6	38.0	0.7	39.0	0.7	40.0	0.7	41.0	0.7	42.0	0.7	89	
	2	37.0	1.3	38.0	1.3	39.0	1.4	40.0	1.4	41.0	1.4	42.0	1.5	88	
1/4	..	37.0	1.8	38.0	1.9	39.0	1.9	40.0	2.0	41.0	2.0	41.9	2.1	..	7 3/4
	3	36.9	1.9	37.9	2.0	38.9	2.0	39.9	2.1	40.9	2.1	41.9	2.2	87	
	4	36.9	2.6	37.9	2.7	38.9	2.7	39.9	2.8	40.9	2.9	41.9	2.9	86	
	5	36.9	3.2	37.9	3.3	38.9	3.4	39.8	3.5	40.8	3.6	41.8	3.7	85	
1/2	..	36.8	3.6	37.8	3.7	38.8	3.8	39.8	3.9	40.8	4.0	41.8	4.1	..	7 1/2
	6	36.8	3.9	37.8	4.0	38.8	4.1	39.8	4.2	40.8	4.3	41.8	4.4	84	
	7	36.7	4.5	37.7	4.6	38.7	4.8	39.7	4.9	40.7	5.0	41.7	5.1	83	
	8	36.6	5.1	37.6	5.3	38.6	5.4	39.6	5.6	40.6	5.7	41.6	5.8	82	
3/4	..	36.6	5.4	37.6	5.6	38.6	5.7	39.6	5.9	40.6	6.0	41.5	6.2	..	7 1/4
	9	36.5	5.8	37.5	5.9	38.5	6.1	39.5	6.3	40.5	6.4	41.5	6.6	81	
	10	36.4	6.4	37.4	6.6	38.4	6.8	39.4	6.9	40.4	7.1	41.4	7.3	80	
	11	36.3	7.1	37.3	7.3	38.3	7.4	39.3	7.6	40.2	7.8	41.2	8.0	79	
1	..	36.3	7.2	37.3	7.4	38.2	7.6	39.2	7.8	40.2	8.0	41.2	8.2	..	7
	12	36.2	7.7	37.2	7.9	38.1	8.1	39.1	8.3	40.1	8.5	41.1	8.7	78	
	13	36.1	8.3	37.0	8.5	38.0	8.8	39.0	9.0	39.9	9.2	40.9	9.4	77	
	14	35.9	9.0	36.9	9.2	37.8	9.4	38.8	9.7	39.8	9.9	40.8	10.2	76	
1/4	..	35.9	9.0	36.9	9.2	37.8	9.5	38.8	9.7	39.8	10.0	40.7	10.2	..	6 3/4
	15	35.7	9.6	36.7	9.8	37.7	10.1	38.6	10.4	39.6	10.6	40.6	10.9	75	
	16	35.6	10.2	36.5	10.5	37.5	10.7	38.5	11.0	39.4	11.3	40.4	11.6	74	
1/2	..	35.4	10.7	36.4	11.0	37.3	11.3	38.3	11.6	39.2	11.9	40.2	12.2	.	6 1/2
	17	35.4	10.8	36.3	11.1	37.3	11.4	38.3	11.7	39.2	12.0	40.2	12.3	73	
	18	35.2	11.4	36.1	11.7	37.1	12.1	38.0	12.4	39.0	12.7	39.9	13.0	72	
	19	35.0	12.0	35.9	12.4	36.9	12.7	37.8	13.0	38.8	13.3	39.7	13.7	71	
3/4	..	34.8	12.5	35.8	12.8	36.7	13.1	37.7	13.5	38.6	13.8	39.5	14.1	..	6 1/4
	20	34.8	12.7	35.7	13.0	36.6	13.3	37.6	13.7	38.5	14.0	39.5	14.4	70	
	21	34.5	13.3	35.5	13.6	36.4	14.0	37.3	14.3	38.3	14.7	39.2	15.1	69	
	22	34.3	13.9	35.2	14.2	36.2	14.6	37.1	15.0	38.0	15.4	38.9	15.7	68	
2	..	34.2	14.2	35.1	14.5	36.0	14.9	37.0	15.3	37.9	15.7	38.8	16.1	.	6
	23	34.1	14.5	35.0	14.8	35.9	15.2	36.8	15.6	37.7	16.0	38.7	16.4	67	
	24	33.8	15.0	34.7	15.5	35.6	15.9	36.5	16.3	37.5	16.7	38.4	17.1	66	
	25	33.5	15.6	34.4	16.1	35.3	16.5	36.3	16.9	37.2	17.3	38.1	17.7	65	
1/4	..	33.4	15.8	34.4	16.2	35.3	16.7	36.2	17.1	37.1	17.5	38.0	18.0	..	5 3/4
	26	33.3	16.2	34.2	16.7	35.1	17.1	36.0	17.5	36.9	18.0	37.7	18.4	64	
	27	33.0	16.8	33.9	17.3	34.7	17.7	35.6	18.2	36.5	18.6	37.4	19.1	63	
	28	32.7	17.4	33.6	17.8	34.4	18.3	35.3	18.8	36.2	19.2	37.1	19.7	62	
1/2	..	32.6	17.4	33.5	17.9	34.4	18.4	35.3	18.9	36.2	19.3	37.0	19.8	.	5 1/2
	29	32.4	17.9	33.2	18.4	34.1	18.9	35.0	19.4	35.9	19.9	36.7	20.4	61	
	30	32.0	18.5	32.9	19.0	33.8	19.5	34.6	20.0	35.5	20.5	36.4	21.0	60	
3/4	..	31.7	19.0	32.6	19.5	33.5	20.0	34.3	20.6	35.2	21.1	36.0	21.6	..	5 1/4
	31	31.7	19.1	32.6	19.6	33.4	20.1	34.3	20.6	35.1	21.1	36.0	21.6	59	
	32	31.4	19.6	32.2	20.1	33.1	20.7	33.9	21.2	34.8	21.7	35.6	22.3	58	
	33	31.0	20.2	31.9	20.7	32.7	21.2	33.5	21.8	34.4	22.3	35.2	22.9	57	
3	..	30.8	20.6	31.6	21.1	32.4	21.7	33.3	22.2	34.1	22.8	34.9	23.3	..	5
	34	30.7	20.7	31.5	21.2	32.3	21.8	33.2	22.4	34.0	22.9	34.8	23.5	56	
	35	30.3	21.2	31.1	21.8	31.9	22.4	32.8	22.9	33.6	23.5	34.4	24.1	55	
	36	29.9	21.7	30.7	22.3	31.6	22.9	32.4	23.5	33.2	24.1	34.0	24.7	54	
1/4	..	29.7	22.0	30.5	22.6	31.3	23.2	32.1	23.8	32.9	24.4	33.7	25.0	..	4 3/4
	37	29.5	22.3	30.3	22.9	31.1	23.5	31.9	24.1	32.7	24.7	33.5	25.3	53	
	38	29.2	22.8	29.9	23.4	30.7	24.0	31.5	24.6	32.3	25.2	33.1	25.9	52	
	39	28.8	23.3	29.5	23.9	30.3	24.5	31.1	25.2	31.9	25.8	32.6	26.4	51	
1/2	..	28.6	23.5	29.4	24.1	30.1	24.7	30.9	25.4	31.7	26.0	32.5	26.6	..	4 1/2
	40	28.3	23.8	29.1	24.4	29.9	25.1	30.6	25.7	31.4	26.4	32.2	27.0	50	
	41	27.9	24.3	28.7	24.9	29.4	25.6	30.2	26.2	30.9	26.9	31.7	27.6	49	
	42	27.5	24.8	28.2	25.4	29.0	26.1	29.7	26.8	30.5	27.4	31.2	28.1	48	
3/4	.	27.4	24.8	28.2	25.5	28.9	26.2	29.6	26.9	30.4	27.5	31.1	28.2	..	4 1/4
	43	27.1	25.2	27.8	25.9	28.5	26.6	29.3	27.3	30.0	28.0	30.7	28.6	47	
	44	26.6	25.7	27.3	26.4	28.1	27.1	28.8	27.8	29.5	28.5	30.2	29.2	46	
4	45	26.2	26.2	26.9	26.9	27.6	27.6	28.3	28.3	29.0	29.0	29.7	29.7	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		37		38		39		40		41		42		Rumos	

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Rumos Pt.	Rumos Gr.	Distancia 43 Lt.	43 Ap.	44 Lt.	44 Ap.	45 Lt.	45 Ap.	46 Lt.	46 Ap.	47 Lt.	47 Ap.	48 Lt.	48 Ap.	Rumos Gr.	Rumos Pt.
	1	43.0	0.8	44.0	0.8	45.0	0.8	46.0	0.8	47.0	0.8	48.0	0.8	89	
	2	43.0	1.5	44.0	1.5	45.0	1.6	46.0	1.6	47.0	1.6	48.0	1.7	88	
1/4	..	42.9	2.1	43.9	2.2	44.9	2.2	45.9	2.3	46.9	2.3	47.9	2.4		7 3/4
	3	42.9	2.3	43.9	2.3	44.9	2.4	45.9	2.4	46.9	2.5	47.9	2.5	87	
	4	42.9	3.0	43.9	3.1	44.9	3.1	45.9	3.2	46.9	3.3	47.9	3.3	86	
	5	42.8	3.7	43.8	3.8	44.8	3.9	45.8	4.0	46.8	4.1	47.8	4.2	85	
1/2	..	42.8	4.2	43.8	4.3	44.8	4.4	45.8	4.5	46.8	4.6	47.8	4.7	..	7 1/2
	6	42.8	4.5	43.8	4.6	44.8	4.7	45.7	4.8	46.7	4.9	47.7	5.0	84	
	7	42.7	5.2	43.7	5.4	44.7	5.5	45.7	5.6	46.6	5.7	47.6	5.8	83	
	8	42.6	6.0	43.6	6.1	44.6	6.3	45.6	6.4	46.5	6.5	47.5	6.7	82	
3/4	..	42.5	6.3	43.5	6.5	44.5	6.6	45.5	6.7	46.5	6.9	47.5	7.0	..	7 1/4
	9	42.5	6.7	43.5	6.9	44.4	7.0	45.4	7.2	46.4	7.4	47.4	7.5	81	
	10	42.3	7.5	43.3	7.6	44.3	7.8	45.3	8.0	46.3	8.2	47.3	8.3	80	
	11	42.2	8.2	43.2	8.4	44.2	8.6	45.2	8.8	46.1	9.0	47.1	9.2	79	
1	..	42.2	8.4	43.2	8.6	44.1	8.8	45.1	9.0	46.1	9.2	47.1	9.4	..	7
	12	42.1	8.9	43.0	9.1	44.0	9.4	45.0	9.6	46.0	9.8	47.0	10.0	78	
	13	41.9	9.7	42.9	9.9	43.8	10.1	44.8	10.3	45.8	10.6	46.8	10.8	77	
	14	41.7	10.4	42.7	10.6	43.7	10.9	44.6	11.1	45.6	11.4	46.6	11.6	76	
1 1/4	..	41.7	10.4	42.7	10.7	43.7	10.9	44.6	11.2	45.6	11.4	46.6	11.7	..	6 3/4
	15	41.5	11.1	42.5	11.4	43.5	11.6	44.4	11.9	45.4	12.2	46.4	12.4	75	
	16	41.3	11.9	42.3	12.1	43.3	12.4	44.2	12.7	45.2	13.0	46.1	13.2	74	
1 1/2	..	41.2	12.5	42.1	12.8	43.1	13.1	44.0	13.3	45.0	13.6	45.9	13.9	..	6 1/2
	17	41.1	12.6	42.1	12.9	43.0	13.2	44.0	13.4	44.9	13.7	45.9	14.0	73	
	18	40.9	13.3	41.8	13.6	42.8	13.9	43.7	14.2	44.7	14.5	45.7	14.8	72	
	19	40.7	14.0	41.6	14.3	42.5	14.7	43.5	15.0	44.4	15.3	45.4	15.6	71	
1 3/4	..	40.5	14.5	41.4	14.8	42.4	15.2	43.3	15.5	44.3	15.8	45.2	16.2	..	6 1/4
	20	40.4	14.7	41.3	15.0	42.3	15.4	43.2	15.7	44.2	16.1	45.1	16.4	70	
	21	40.1	15.4	41.1	15.8	42.0	16.1	42.9	16.5	43.9	16.8	44.8	17.2	69	
	22	39.9	16.1	40.8	16.5	41.7	16.9	42.7	17.2	43.6	17.6	44.5	18.0	68	
2	..	39.7	16.5	40.6	16.8	41.6	17.2	42.5	17.6	43.4	18.0	44.4	18.4	..	6
	23	39.6	16.8	40.5	17.2	41.4	17.6	42.3	18.0	43.3	18.4	44.2	18.8	67	
	24	39.3	17.5	40.2	17.9	41.1	18.3	42.0	18.7	42.9	19.1	43.9	19.5	66	
	25	39.0	18.2	39.9	18.6	40.8	19.0	41.7	19.4	42.6	19.9	43.5	20.3	65	
2 1/4	..	38.9	18.4	39.8	18.8	40.7	19.2	41.6	19.7	42.5	20.1	43.4	20.5	..	5 3/4
	26	38.6	18.8	39.5	19.3	40.4	19.7	41.3	20.2	42.2	20.6	43.1	21.0	64	
	27	38.3	19.5	39.2	20.0	40.1	20.4	41.0	20.9	41.9	21.3	42.8	21.8	63	
	28	38.0	20.2	38.8	20.7	39.7	21.1	40.6	21.6	41.5	22.1	42.4	22.5	62	
2 1/2	..	37.9	20.3	38.8	20.7	39.7	21.2	40.6	21.7	41.5	22.2	42.3	22.6	..	5 1/2
	29	37.6	20.8	38.5	21.3	39.4	21.8	40.2	22.3	41.1	22.8	42.0	23.3	61	
	30	37.2	21.5	38.1	22.0	39.0	22.5	39.8	23.0	40.7	23.5	41.6	24.0	60	
2 3/4	..	36.9	22.1	37.7	22.6	38.6	23.1	39.5	23.6	40.3	24.2	41.2	24.7	..	5 1/4
	31	36.9	22.1	37.7	22.7	38.6	23.2	39.4	23.7	40.3	24.2	41.1	24.7	59	
	32	36.5	22.8	37.3	23.3	38.2	23.8	39.0	24.4	39.9	24.9	40.7	25.4	58	
	33	36.1	23.4	36.9	24.0	37.7	24.5	38.6	25.1	39.4	25.6	40.3	26.1	57	
3	..	35.8	23.9	36.6	24.4	37.4	25.0	38.2	25.6	39.1	26.1	39.9	26.7	..	5
	34	35.6	24.0	36.5	24.6	37.3	25.2	38.1	25.7	39.0	26.3	39.8	26.8	56	
	35	35.2	24.7	36.0	25.2	36.9	25.8	37.7	26.4	38.5	27.0	39.3	27.5	55	
	36	34.8	25.3	35.6	25.9	36.4	26.5	37.2	27.0	38.0	27.6	38.8	28.2	54	
3 1/4	..	34.5	25.6	35.3	26.2	36.1	26.8	36.9	27.4	37.7	28.0	38.6	28.6	..	4 3/4
	37	34.3	25.9	35.1	26.5	35.9	27.1	36.7	27.7	37.5	28.3	38.3	28.9	53	
	38	33.9	26.5	34.7	27.1	35.5	27.7	36.2	28.3	37.0	28.9	37.8	29.6	52	
	39	33.4	27.1	34.2	27.7	35.0	28.3	35.7	28.9	36.5	29.6	37.3	30.2	51	
3 1/2	..	33.2	27.3	34.0	27.9	34.8	28.5	35.6	29.2	36.3	29.8	37.1	30.4	..	4 1/2
	40	32.9	27.6	33.7	28.3	34.5	28.9	35.2	29.6	36.0	30.2	36.8	30.9	50	
	41	32.5	28.2	33.2	28.9	34.0	29.5	34.7	30.2	35.5	30.8	36.2	31.5	49	
	42	32.0	28.8	32.7	29.4	33.4	30.1	34.2	30.8	34.9	31.4	35.7	32.1	48	
3 3/4	..	31.9	28.9	32.6	29.5	33.3	30.2	34.1	30.9	34.8	31.6	35.6	32.2	..	4 1/4
	43	31.4	29.3	32.2	30.0	32.9	30.7	33.6	31.4	34.4	32.1	35.1	32.7	47	
	44	30.9	29.9	31.7	30.6	32.4	31.3	33.1	32.0	33.8	32.6	34.5	33.3	46	
4	45	30.4	30.4	31.1	31.1	31.8	31.8	32.5	32.5	33.2	33.2	33.9	33.9	45	4
Pt. Rumos	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt. Rumos
Rumos		43		44		45		46		47		48			Rumos

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Rumos Pt.	Gr.	Distancia 49 Lt.	49 Ap.	50 Lt.	50 Ap.	51 Lt.	51 Ap.	52 Lt.	52 Ap.	53 Lt.	53 Ap.	54 Lt.	54 Ap.	Gr.	Rumos Pt.
	1	49.0	0.9	50.0	0.9	51.0	0.9	52.0	0.9	53.0	0.9	54.0	0.9	89	
	2	49.0	1.7	50.0	1.7	51.0	1.8	52.0	1.8	53.0	1.8	54.0	1.9	88	
1/4	..	48.9	2.4	49.9	2.5	50.9	2.5	51.9	2.6	52.9	2.6	53.9	2.7	..	7 3/4
	3	48.9	2.6	49.9	2.6	50.9	2.7	51.9	2.7	52.9	2.8	53.9	2.8	87	
	4	48.9	3.4	49.9	3.5	50.9	3.6	51.9	3.6	52.9	3.7	53.9	3.8	86	
	5	48.8	4.3	49.8	4.4	50.8	4.4	51.8	4.5	52.8	4.6	53.8	4.7	85	
1/2	..	48.8	4.8	49.8	4.9	50.8	5.0	51.7	5.1	52.7	5.2	53.7	5.3	..	7 1/2
	6	48.7	5.1	49.7	5.2	50.7	5.3	51.7	5.4	52.7	5.5	53.7	5.6	84	
	7	48.6	6.0	49.6	6.1	50.6	6.2	51.6	6.3	52.6	6.5	53.6	6.6	83	
	8	48.5	6.8	49.5	7.0	50.5	7.1	51.5	7.2	52.5	7.4	53.5	7.5	82	
3/4	..	48.5	7.2	49.5	7.3	50.4	7.5	51.4	7.6	52.4	7.8	53.4	7.9	..	7 1/4
	9	48.4	7.7	49.4	7.8	50.4	8.0	51.4	8.1	52.3	8.3	53.3	8.4	81	
	10	48.3	8.5	49.2	8.7	50.2	8.9	51.2	9.0	52.2	9.2	53.2	9.4	80	
	11	48.1	9.3	49.1	9.5	50.1	9.7	51.0	9.9	52.0	10.1	53.0	10.3	79	
1	..	48.1	9.6	49.0	9.8	50.0	10.0	51.0	10.1	52.0	10.3	53.0	10.5	..	7
	12	47.9	10.2	48.9	10.4	49.9	10.6	50.9	10.8	51.8	11.0	52.8	11.2	78	
	13	47.7	11.0	48.7	11.2	49.7	11.5	50.7	11.7	51.6	11.9	52.6	12.1	77	
	14	47.5	11.9	48.5	12.1	49.5	12.3	50.5	12.6	51.4	12.8	52.4	13.1	76	
1 1/4	..	47.5	11.9	48.5	12.2	49.5	12.4	50.4	12.6	51.4	12.9	52.4	13.1	..	6 3/4
	15	47.3	12.7	48.3	12.9	49.3	13.2	50.2	13.5	51.2	13.7	52.2	14.0	75	
	16	47.1	13.5	48.1	13.8	49.0	14.1	50.0	14.3	50.9	14.6	51.9	14.9	74	
1 1/2	..	46.9	14.2	47.9	14.5	48.8	14.8	49.8	15.1	50.7	15.4	51.7	15.7	..	6 1/2
	17	46.9	14.3	47.8	14.6	48.8	14.9	49.7	15.2	50.7	15.5	51.6	15.8	73	
	18	46.6	15.1	47.6	15.5	48.5	15.8	49.5	16.1	50.4	16.4	51.4	16.7	72	
	19	46.3	16.0	47.3	16.3	48.2	16.6	49.2	16.9	50.1	17.3	51.1	17.6	71	
1 3/4	..	46.1	16.5	47.1	16.8	48.0	17.2	49.0	17.5	49.9	17.9	50.8	18.2	..	6 1/4
	20	46.0	16.8	47.0	17.1	47.9	17.4	48.9	17.8	49.8	18.1	50.7	18.5	70	
	21	45.7	17.6	46.7	17.9	47.6	18.3	48.5	18.6	49.5	19.0	50.4	19.4	69	
	22	45.4	18.4	46.4	18.7	47.3	19.1	48.2	19.5	49.1	19.9	50.1	20.2	68	
2	..	45.3	18.8	46.2	19.1	47.1	19.5	48.0	19.9	49.0	20.3	49.9	20.7	..	6
	23	45.1	19.1	46.0	19.5	46.9	19.9	47.9	20.3	48.8	20.7	49.7	21.1	67	
	24	44.8	19.9	45.7	20.3	46.6	20.7	47.5	21.2	48.4	21.6	49.3	22.0	66	
	25	44.4	20.7	45.3	21.1	46.2	21.6	47.1	22.0	48.0	22.4	48.9	22.8	65	
2 1/4	..	44.3	21.0	45.2	21.4	46.1	21.8	47.0	22.2	47.9	22.7	48.8	23.1	..	5 3/4
	26	44.0	21.5	44.9	21.9	45.8	22.4	46.7	22.8	47.6	23.2	48.5	23.7	64	
	27	43.7	22.2	44.6	22.7	45.4	23.2	46.3	23.6	47.2	24.1	48.1	24.5	63	
	28	43.3	23.0	44.1	23.5	45.0	23.9	45.9	24.4	46.8	24.9	47.7	25.4	62	
2 1/2	..	43.2	23.1	44.1	23.6	45.0	24.0	45.9	24.5	46.7	25.0	47.6	25.5	..	5 1/2
	29	42.9	23.8	43.7	24.2	44.6	24.7	45.5	25.2	46.4	25.7	47.2	26.2	61	
	30	42.4	24.5	43.3	25.9	44.2	25.5	45.0	26.0	45.9	26.5	46.8	27.0	60	
2 3/4	..	42.0	25.2	42.9	25.7	43.7	26.2	44.6	26.7	45.5	27.2	46.3	27.8	..	5 1/4
	31	42.0	25.2	42.9	25.8	43.7	26.3	44.6	26.8	45.4	27.3	46.3	27.8	59	
	32	41.6	26.0	42.4	26.5	43.3	27.0	44.1	27.6	44.9	28.1	45.8	28.6	58	
	33	41.1	26.7	41.9	27.2	42.8	27.8	43.6	28.3	44.4	28.9	45.3	29.4	57	
3	..	40.7	27.2	41.6	27.8	42.4	28.3	43.2	28.9	44.1	29.4	44.9	30.0	..	5
	34	40.6	27.4	41.5	28.0	42.3	28.5	43.1	29.1	43.9	29.6	44.8	30.2	56	
	35	40.1	28.1	41.0	28.7	41.8	29.3	42.6	29.8	43.4	30.4	44.2	31.0	55	
	36	39.6	28.8	40.5	29.4	41.3	30.0	42.1	30.6	42.9	31.2	43.7	31.7	54	
3 1/4	..	39.4	29.2	40.2	29.8	41.0	30.4	41.8	31.0	42.6	31.6	43.4	32.2	..	4 3/4
	37	39.1	29.5	39.9	30.1	40.7	30.7	41.5	31.3	42.3	31.9	43.1	32.5	53	
	38	38.6	30.2	39.4	30.8	40.2	31.4	41.0	32.0	41.8	32.6	42.6	33.2	52	
	39	38.1	30.8	38.9	31.5	39.6	32.1	40.4	32.7	41.2	33.4	42.0	34.0	51	
3 1/2	..	37.9	31.1	38.6	31.7	39.4	32.3	40.2	33.0	41.0	33.6	41.7	34.3	..	4 1/2
	40	37.3	31.5	38.3	32.1	39.1	32.8	39.8	33.4	40.6	34.1	41.4	34.7	50	
	41	37.0	32.1	37.7	32.8	38.5	33.5	39.2	34.1	40.0	34.8	40.8	35.4	49	
	42	36.4	32.8	37.2	33.5	37.9	34.1	38.6	34.8	39.4	35.5	40.1	36.1	48	
3 3/4	..	36.3	32.9	37.0	33.6	37.8	34.2	38.5	34.9	39.3	35.6	40.0	36.3	..	4 1/4
	43	35.8	33.4	36.6	34.1	37.3	34.8	38.0	35.5	38.8	36.1	39.5	36.8	47	
	44	35.2	34.0	36.0	34.7	36.7	35.4	37.4	36.1	38.1	36.8	38.8	37.5	46	
4	45	34.6	34.6	35.4	35.4	36.1	36.1	36.8	36.8	37.5	37.5	38.2	38.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		49		50		51		52		53		54			Rumos

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Estima

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Rumos Pt.	Gr.	Distancia 55 Lt.	55 Ap.	56 Lt.	56 Ap.	57 Lt.	57 Ap.	58 Lt.	58 Ap.	59 Lt.	59 Ap.	60 Lt.	60 Ap.	Gr.	Rumos Pt.
	1	55.0	1.0	56.0	1.0	57.0	1.0	58.0	1.0	59.0	1.0	60.0	1.0	89	
	2	55.0	1.9	56.0	2.0	57.0	2.0	58.0	2.0	59.0	2.1	60.0	2.1	88	
1/4	..	54.9	2.7	55.9	2.8	56.9	2.8	57.9	2.9	58.9	2.9	59.9	2.9	..	7 3/4
	3	54.9	2.9	55.9	2.9	56.9	3.0	57.9	3.0	58.9	3.1	59.9	3.1	87	
	4	54.9	3.8	55.9	3.9	56.9	4.0	57.9	4.0	58.9	4.1	59.9	4.2	86	
	5	54.8	4.8	55.8	4.9	56.8	5.0	57.8	5.1	58.8	5.1	59.8	5.2	85	
1/2	..	54.7	5.4	55.7	5.5	56.7	5.6	57.7	5.7	58.7	5.8	59.7	5.9	..	7 1/2
	6	54.7	5.7	55.7	5.9	56.7	6.0	57.7	6.1	58.7	6.2	59.7	6.3	84	
	7	54.6	6.7	55.6	6.8	56.6	6.9	57.6	7.1	58.6	7.2	59.6	7.3	83	
	8	54.5	7.7	55.5	7.8	56.4	7.9	57.4	8.1	58.4	8.2	59.4	8.4	82	
3/4	..	54.4	8.1	55.4	8.2	56.4	8.4	57.4	8.5	58.4	8.7	59.3	8.8	..	7 1/4
	9	54.3	8.6	55.3	8.8	56.3	8.9	57.3	9.1	58.3	9.2	59.3	9.4	81	
	10	54.2	9.6	55.1	9.7	56.1	9.9	57.1	10.1	58.1	10.2	59.1	10.4	80	
	11	54.0	10.5	55.0	10.7	56.0	10.9	56.9	11.1	57.9	11.3	58.9	11.4	79	
1	..	53.9	10.7	54.9	10.9	55.9	11.1	56.9	11.3	57.9	11.5	58.8	11.7	..	7
	12	53.8	11.4	54.8	11.6	55.8	11.9	56.7	12.1	57.7	12.3	58.7	12.5	78	
	13	53.6	12.4	54.6	12.6	55.5	12.8	56.5	13.0	57.5	13.3	58.5	13.5	77	
	14	53.4	13.3	54.3	13.5	55.3	13.8	56.3	14.0	57.2	14.3	58.2	14.5	76	
1 1/4	..	53.4	13.4	54.3	13.6	55.3	13.9	56.3	14.1	57.2	14.3	58.2	14.6	..	6 3/4
	15	53.1	14.2	54.1	14.5	55.1	14.8	56.0	15.0	57.0	15.3	58.0	15.5	75	
	16	52.9	15.2	53.8	15.4	54.8	15.7	55.8	16.0	56.7	16.3	57.7	16.5	74	
1 1/2	..	52.6	16.0	53.6	16.3	54.5	16.5	55.5	16.8	56.5	17.1	57.4	17.4	..	6 1/2
	17	52.6	16.1	53.6	16.4	54.5	16.7	55.5	17.0	56.4	17.2	57.4	17.5	73	
	18	52.3	17.0	53.3	17.3	54.2	17.6	55.2	17.9	56.1	18.2	57.1	18.5	72	
	19	52.0	17.9	52.9	18.2	53.9	18.6	54.8	18.9	55.8	19.2	56.7	19.5	71	
1 3/4	..	51.8	18.5	52.7	18.9	53.7	19.2	54.6	19.5	55.5	19.9	56.5	20.2	..	6 1/4
	20	51.7	18.8	52.6	19.2	53.6	19.5	54.5	19.8	55.4	20.2	56.4	20.5	70	
	21	51.3	19.7	52.3	20.1	53.2	20.4	54.1	20.8	55.1	21.1	56.0	21.5	69	
	22	51.0	20.0	51.9	21.0	52.8	21.4	53.8	21.7	54.7	22.1	55.6	22.5	68	
2	..	50.8	21.0	51.7	21.4	52.7	21.8	53.6	22.2	54.5	22.6	55.4	23.0	..	6
	23	50.6	21.5	51.5	21.9	52.5	22.3	53.4	22.7	54.3	23.1	55.2	23.4	67	
	24	50.2	22.4	51.2	22.8	52.1	23.2	53.0	23.6	53.9	24.0	54.8	24.4	66	
	25	49.8	23.2	50.8	23.7	51.7	24.1	52.6	24.5	53.5	24.9	54.4	25.4	65	
2 1/4	..	49.7	23.5	50.6	23.9	51.5	24.4	52.4	24.8	53.3	25.2	54.2	25.7	..	5 3/4
	26	49.4	24.1	50.3	24.5	51.2	25.0	52.1	25.4	53.0	25.9	53.9	26.3	64	
	27	49.0	25.0	49.9	25.4	50.8	25.9	51.7	26.3	52.6	26.8	53.5	27.2	63	
	28	48.6	25.8	49.4	26.3	50.3	26.8	51.2	27.2	52.1	27.7	53.0	28.2	62	
2 1/2	..	48.5	25.9	49.3	26.4	50.3	26.9	51.2	27.3	52.0	27.8	52.9	28.3	..	5 1/2
	29	48.1	26.7	49.0	27.1	49.9	27.6	50.7	28.1	51.6	28.6	52.5	29.1	61	
	30	47.6	27.5	48.5	28.0	49.4	28.5	50.2	29.0	51.1	29.5	52.0	30.0	60	
2 3/4	..	47.2	28.3	48.0	28.8	48.9	29.3	49.7	29.8	50.6	30.3	51.5	30.8	..	5 1/4
	31	47.1	28.3	48.0	28.8	48.9	29.4	49.7	29.9	50.6	30.4	51.4	30.9	59	
	32	46.6	29.1	47.5	29.7	48.3	30.2	49.2	30.7	50.0	31.3	50.9	31.8	58	
	33	46.1	30.0	47.0	30.5	47.8	31.0	48.6	31.6	49.5	32.1	50.3	32.7	57	
3	..	45.7	30.6	46.6	31.1	47.4	31.7	48.2	32.2	49.1	32.8	49.9	33.3	..	5
	34	45.6	30.8	46.4	31.3	47.3	31.9	48.1	32.4	48.9	33.0	49.7	33.6	56	
	35	45.1	31.5	45.9	32.1	46.7	32.7	47.5	33.3	48.3	33.8	49.1	34.4	55	
	36	44.5	32.3	45.3	33.9	46.1	33.5	46.9	34.1	47.7	34.7	48.5	35.3	54	
3 1/4	..	44.2	32.8	45.0	33.4	45.8	34.0	46.6	34.6	47.4	35.1	48.2	35.7	..	4 3/4
	37	43.9	33.1	44.7	33.7	45.5	34.3	46.3	34.9	47.1	35.5	47.9	36.1	53	
	38	43.3	33.9	44.1	34.5	44.9	35.1	45.7	35.7	46.5	36.3	47.3	36.9	52	
3 1/2	39	42.7	34.6	43.5	35.2	44.3	35.9	45.1	36.5	45.9	37.1	46.6	37.8	51	
	..	42.5	34.9	43.3	35.5	44.1	36.2	44.8	36.8	45.6	37.4	46.4	38.1	..	4 1/2
	40	42.1	35.4	42.9	36.0	43.7	36.6	44.4	37.3	45.2	37.9	46.0	38.6	50	
	41	41.5	36.1	42.3	36.7	43.0	37.4	43.8	38.1	44.5	38.7	45.3	39.4	49	
3 3/4	42	40.9	36.8	41.6	37.5	42.4	38.1	43.1	38.8	43.8	39.5	44.6	40.1	48	
	..	40.7	36.9	41.5	37.6	42.2	38.3	43.0	38.9	43.7	39.6	44.5	40.3	..	4 1/4
	43	40.2	37.5	41.0	38.2	41.7	38.9	42.4	39.6	43.1	40.2	43.9	40.9	47	
	44	39.6	38.2	40.3	38.9	41.0	39.6	41.7	40.3	42.4	41.0	43.2	41.7	46	
4	45	38.9	38.9	39.6	39.6	40.3	40.3	41.0	41.0	41.7	41.7	42.4	42.4	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		55		56		57		58		59		60			Rumos

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Estima

Rumos Pt.	Rumos Gr.	Distancia 61 Lt.	61 Ap.	62 Lt.	62 Ap.	63 Lt.	63 Ap.	64 Lt.	64 Ap.	65 Lt.	65 Ap.	66 Lt.	66 Ap.	Rumos Gr.	Rumos Pt.
	1	61.0	1.1	62.0	1.1	63.0	1.1	64.0	1.1	65.0	1.1	66.0	1.2	89	
	2	61.0	2.1	62.0	2.2	63.0	2.2	64.0	2.2	65.0	2.3	66.0	2.3	88	
1/4	..	60.9	3.0	61.9	3.0	62.9	3.1	63.9	3.1	64.9	3.2	65.9	3.2	..	7 3/4
	3	60.9	3.2	61.9	3.2	62.9	3.3	63.9	3.3	64.9	3.4	65.9	3.5	87	
	4	60.9	4.3	61.8	4.3	62.8	4.4	63.8	4.5	64.8	4.5	65.8	4.6	86	
	5	60.8	5.3	61.8	5.4	62.8	5.5	63.8	5.6	64.8	5.7	65.7	5.8	85	
1/2	..	60.7	6.0	61.7	6.1	62.7	6.2	63.7	6.3	64.7	6.4	65.7	6.5	.	7 1/2
	6	60.7	6.4	61.7	6.5	62.7	6.6	63.6	6.7	64.6	6.8	65.6	6.9	84	
	7	60.5	7.4	61.5	7.6	62.5	7.7	63.5	7.8	64.5	7.9	65.5	8.0	83	
	8	60.4	8.5	61.4	8.6	62.4	8.8	63.4	8.9	64.4	9.0	65.4	9.2	82	
3/4	..	60.3	8.9	61.3	9.1	62.3	9.2	63.3	9.4	64.3	9.5	65.3	9.7	..	7 1/4
	9	60.2	9.5	61.2	9.7	62.2	9.9	63.2	10.0	64.2	10.2	65.2	10.3	81	
	10	60.1	10.6	61.1	10.8	62.0	10.9	63.0	11.1	64.0	11.3	65.0	11.5	80	
	11	59.9	11.6	60.9	11.8	61.8	12.0	62.8	12.2	63.8	12.4	64.8	12.6	79	
1	..	59.8	11.9	60.8	12.1	61.8	12.3	62.8	12.5	63.7	12.7	64.7	12.9	..	7
	12	59.7	12.7	60.6	12.9	61.6	13.1	62.6	13.3	63.6	13.5	64.6	13.7	78	
	13	59.4	13.7	60.4	13.9	61.4	14.2	62.4	14.4	63.3	14.6	64.3	14.8	77	
	14	59.2	14.8	60.2	15.0	61.1	15.2	62.1	15.5	63.1	15.7	64.0	16.0	76	
1 1/4	..	59.2	14.8	60.1	15.1	61.1	15.3	62.1	15.6	63.1	15.8	64.0	16.0	.	6 3/4
	15	58.9	15.8	59.9	16.0	60.9	16.3	61.8	16.6	62.8	16.8	63.8	17.1	75	
	16	58.6	16.8	59.6	17.1	60.6	17.4	61.5	17.6	62.5	17.9	63.4	18.2	74	
1 1/2	..	58.4	17.7	59.3	18.0	60.3	18.3	61.2	18.6	62.2	18.9	63.2	19.2	..	6 1/2
	17	58.3	17.8	59.3	18.1	60.2	18.4	61.2	18.7	62.2	19.0	63.1	19.3	73	
	18	58.0	18.9	59.0	19.2	59.9	19.5	60.9	19.8	61.8	20.1	62.8	20.4	72	
	19	57.7	19.9	58.6	20.2	59.6	20.5	60.5	20.8	61.5	21.2	62.4	21.5	71	
1 3/4	..	57.4	20.5	58.4	20.9	59.3	21.2	60.3	21.6	61.2	21.9	62.1	22.2	..	6 1/4
	20	57.3	20.9	58.3	21.2	59.2	21.5	60.1	21.9	61.1	22.2	62.0	22.6	70	
	21	56.9	21.9	57.9	22.2	58.8	22.6	59.7	22.9	60.7	23.3	61.6	23.7	69	
	22	56.6	22.9	57.5	23.2	58.4	23.6	59.3	24.0	60.3	24.3	61.2	24.7	68	
2	..	56.4	23.3	57.3	23.7	58.2	24.1	59.1	24.5	60.1	24.9	61.0	25.3	..	6
	23	56.2	23.8	57.1	24.2	58.0	24.6	58.9	25.0	59.8	25.4	60.8	25.8	67	
	24	55.7	24.8	56.6	25.2	57.6	25.6	58.5	26.0	59.4	26.4	60.3	26.8	66	
	25	55.3	25.8	56.2	26.2	57.1	26.6	58.0	27.0	58.9	27.5	59.8	27.9	65	
2 1/4	..	55.1	26.1	56.0	26.5	57.0	26.9	57.9	27.4	58.8	27.8	59.7	28.2	..	5 3/4
	26	54.8	26.7	55.7	27.2	56.6	27.6	57.5	28.1	58.4	28.5	59.3	28.9	64	
	27	54.4	27.7	55 2	28.1	56.1	28.6	57.0	29.1	57.9	29.5	58.8	30.0	63	
	28	53.9	28.6	54.7	29.1	55.6	29.6	56.5	30.0	57.4	30.5	58.3	31.0	62	
2 1/2	..	53.8	28.8	54.7	29.2	55.6	29.7	56.4	30.2	57.3	30.6	58.2	31.1	..	5 1/2
	29	53.4	29.6	54.2	30.1	55.1	30.5	56.0	31.0	56.9	31.5	57.7	32.0	61	
	30	52.8	30.5	53.7	31.0	54.6	31.5	55.4	32.0	56.3	32.5	57.2	33.0	60	
2 3/4	..	52.3	31.4	53.2	31.9	54.0	32.4	54.9	32.9	55.8	33.4	56.6	33.9	..	5 1/4
	31	52.3	31.4	53.1	31.9	54.0	32.4	54.9	33.0	55.7	33.5	56.6	34.0	59	
	32	51.7	32.3	52.6	32.9	53.4	33.4	54.3	33.9	55.1	34.4	56.0	35.0	58	
	33	51.2	33.2	52.0	33.8	52.8	34.3	53.7	34.9	54.5	35.4	55.4	35.9	57	
3	..	50.7	33.9	51.5	34.4	52.4	35.0	53.2	35.6	54.0	36.1	54.9	36.7	..	5
	34	50.6	34.1	51.4	34.7	52.2	35.2	53.1	35.8	53.9	36.3	54.7	36.9	56	
	35	50.0	35.0	50.8	35.6	51.6	36.1	52.4	36.7	53.2	37.3	54.1	37.9	55	
	36	49.4	35.9	50.2	36.4	51.0	37.0	51.8	37.6	52.6	38.2	53.4	38.8	54	
3 1/4	..	49.0	36.3	49.8	36.9	50.6	37.5	51.4	38.1	52.2	38.7	53.0	39.3	.	4 3/4
	37	48.7	36.7	49.5	37.3	50.3	37.9	51.1	38.5	51.9	39 1	52.7	39.7	53	
	38	48.1	37.6	48.9	38.2	49.6	38.8	50.4	39.4	51.2	40.0	52.0	40.6	52	
	39	47.4	38.4	48.2	39.0	49.0	39.6	49.7	40.3	50.5	40.9	51.3	41.5	51	
3 1/2	..	47.1	38.7	47.9	39.3	48.7	40.0	49.5	40.6	50.2	41.2	51.0	41.9	..	4 1/2
	40	46.7	39.2	47.5	39.9	48.3	40.5	49.0	41.1	49.8	41.8	50.6	42.4	50	
	41	46.0	40.0	46.8	40.7	47.5	41.3	48.3	42.0	49.1	42.6	49.8	43.3	49	
	42	45.3	40.8	46.1	41.5	46.8	42.2	47.6	42.8	48.3	43.5	49.0	44.2	48	
3 3/4	..	45.2	41.0	45.9	41.6	46.7	42.3	47.4	43.0	48.2	43.6	48.9	44.3	..	4 1/4
	43	44.6	41.6	45.3	42.3	46.1	43.0	46.8	43.6	47.5	44.3	48.3	45.0	47	
	44	43.9	42.4	44.6	43.1	45.3	43.8	46.0	44.5	46.8	45.2	47.5	45.8	46	
4	45	43.1	43.1	43.8	43.8	44.5	44.5	45.3	45.3	46.0	46.0	46.7	46.7	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		61		62		63		64		65		66		Rumos	

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Rumos Pt.	Gr.	Distancia 67 Lt.	67 Ap.	68 Lt.	68 Ap.	69 Lt.	69 Ap.	70 Lt.	70 Ap.	71 Lt.	71 Ap.	72 Lt.	72 Ap.	Rumos Gr.	Pt.
	1	67.0	1.2	68.0	1.2	69.0	1.2	70.0	1.2	71.0	1.2	72.0	1.3	89	
	2	67.0	2.3	68.0	2.4	69.0	2.4	70.0	2.4	71.0	2.5	72.0	2.5	88	
$\frac{1}{4}$	..	66.9	3.3	67.9	3.3	68.9	3.4	69.9	3.4	70.9	3.5	71.9	3.5	..	$7\frac{3}{4}$
	3	66.9	3.5	67.9	3.6	68.9	3.6	69.9	3.7	70.9	3.7	71.9	3.8	87	
	4	66.8	4.7	67.8	4.7	68.8	4.8	69.8	4.9	70.8	5.0	71.8	5.0	86	
	5	66.7	5.8	67.7	5.9	68.7	6.0	69.7	6.1	70.7	6.2	71.7	6.3	85	
$\frac{1}{2}$	..	66.7	6.6	67.7	6.7	68.7	6.8	69.7	6.9	70.7	7.0	71.7	7.1	..	$7\frac{1}{2}$
	6	66.6	7.0	67.6	7.1	68.6	7.2	69.6	7.3	70.6	7.4	71.6	7.5	84	
	7	66.5	8.2	67.5	8.3	68.5	8.4	69.5	8.5	70.5	8.7	71.5	8.8	83	
	8	66.3	9.3	67.3	9.5	68.3	9.6	69.3	9.7	70.3	9.9	71.3	10.0	82	
$\frac{3}{4}$	..	66.3	9.8	67.3	10.0	68.2	10.1	69.2	10.3	70.2	10.4	71.2	10.6	..	$7\frac{1}{4}$
	9	66.2	10.5	67.2	10.6	68.2	10.8	69.1	11.0	70.1	11.1	71.1	11.3	81	
	10	66.0	11.6	67.0	11.8	68.0	12.0	68.9	12.2	69.9	12.3	70.9	12.5	80	
	11	65.8	12.8	66.8	13.0	67.7	13.2	68.7	13.4	69.7	13.5	70.7	13.7	79	
1	..	65.7	13.1	66.7	13.3	67.7	13.5	68.7	13.7	69.6	13.9	70.6	14.0	..	7
	12	65.5	13.9	66.5	14.1	67.5	14.3	68.5	14.6	69.4	14.8	70.4	15.0	78	
	13	65.3	15.1	66.3	15.3	67.2	15.5	68.2	15.7	69.2	16.0	70.2	16.2	77	
	14	65.0	16.2	66.0	16.5	67.0	16.7	67.9	16.9	68.9	17.2	69.9	17.4	76	
$1\frac{1}{4}$	..	65.0	16.3	66.0	16.5	66.9	16.8	67.9	17.0	68.9	17.3	69.8	17.5	.	$6\frac{3}{4}$
	15	64.7	17.3	65.7	17.6	66.6	17.9	67.6	18.1	68.6	18.4	69.5	18.6	75	
	16	64.4	18.5	65.4	18.7	66.3	19.0	67.3	19.3	68.2	19.6	69.2	19.8	74	
$1\frac{1}{2}$	..	64.1	19.4	65.1	19.7	66.0	20.0	67.0	20.3	67.9	20.6	68.9	20.9	..	$6\frac{1}{2}$
	17	64.1	19.6	65.0	19.9	66.0	20.2	66.9	20.5	67.9	20.8	68.9	21.1	73	
	18	63.7	20.7	64.7	21.0	65.6	21.3	66.6	21.6	67.5	21.9	68.5	22.2	72	
	19	63.3	21.8	64.3	22.1	65.2	22.5	66.2	22.8	67.1	23.1	68.1	23.4	71	
$1\frac{3}{4}$	..	63.1	22.6	64.0	22.9	65.0	23.2	65.9	23.6	66.8	23.9	67.8	24.3	..	$6\frac{1}{4}$
	20	63.0	22.9	63.9	23.3	64.8	23.6	65.8	23.9	66.7	24.3	67.7	24.6	70	
	21	62.5	24.0	63.5	24.4	64.4	24.7	65.4	25.1	66.3	25.4	67.2	25.8	69	
	22	62.1	25.1	63.0	25.5	64.0	25.8	64.9	26.2	65.8	26.6	66.8	27.0	68	
2	..	61.9	25.6	62.8	26.0	63.8	26.4	64.7	26.8	65.6	27.2	66.5	27.6	..	6
	23	61.7	26.2	62.6	26.6	63.5	27.0	64.4	27.4	65.4	27.7	66.3	28.1	67	
	24	61.2	27.3	62.1	27.7	63.0	28.1	63.9	28.5	64.9	28.9	65.8	29.3	66	
	25	60.7	28.3	61.6	28.7	62.5	29.2	63.4	29.6	64.3	30.0	65.3	30.4	65	
$2\frac{1}{4}$	..	60.6	28.6	61.5	29.1	62.4	29.5	63.3	29.9	64.2	30.4	65.1	30.8	..	$5\frac{3}{4}$
	26	60.2	29.4	61.1	29.8	62.0	30.2	62.9	30.7	63.8	31.1	64.7	31.6	64	
	27	59.7	30.4	60.6	30.9	61.5	31.3	62.4	31.8	63.3	32.2	64.2	32.7	63	
	28	59.2	31.5	60.0	31.9	60.9	32.4	61.8	32.9	62.7	33.3	63.6	33.8	62	
$2\frac{1}{2}$	..	59.1	31.6	60.0	32.1	60.9	32.5	61.7	33.0	62.6	33.5	63.5	33.9	..	$5\frac{1}{2}$
	29	58.6	32.5	59.5	33.0	60.3	33.5	61.2	33.9	62.1	34.4	63.0	34.9	61	
	30	58.0	33.5	58.9	34.0	59.8	34.5	60.6	35.0	61.5	35.5	62.4	36.0	60	
$2\frac{3}{4}$	..	57.5	34.4	58.3	35.0	59.2	35.5	60.0	36.0	60.9	36.5	61.8	37.0	..	$5\frac{1}{4}$
	31	57.4	34.5	58.3	35.0	59.1	35.5	60.0	36.1	60.9	36.6	61.7	37.1	59	
	32	56.8	35.5	57.7	36.0	58.5	36.6	59.4	37.1	60.2	37.6	61.1	38.1	58	
	33	56.2	36.5	57.0	37.0	57.9	37.6	58.7	38.1	59.5	38.7	60.4	39.2	57	
3	..	55.7	37.2	56.5	37.8	57.4	38.3	58.2	38.9	59.0	39.4	59.9	40.0	..	5
	34	55.5	37.5	56.4	38.0	57.2	38.6	58.0	39.1	58.9	39.7	59.7	40.3	56	
	35	54.9	38.4	55.7	39.0	56.5	39.6	57.3	40.2	58.2	40.7	59.0	41.3	55	
	36	54.2	39.4	55.0	40.0	55.8	40.6	56.6	41.1	57.4	41.7	58.2	42.3	54	
$3\frac{1}{4}$	..	53.8	39.9	54.6	40.5	55.4	41.1	56.2	41.7	57.0	42.3	57.8	42.9	..	$4\frac{3}{4}$
	37	53.5	40.3	54.3	40.9	55.1	41.5	55.9	42.1	56.7	42.7	57.5	43.3	53	
	38	52.8	41.2	53.6	41.9	54.4	42.5	55.2	43.1	55.9	43.7	56.7	44.3	52	
	39	52.1	42.2	52.8	42.8	53.6	43.4	54.4	44.1	55.2	44.7	56.0	45.3	51	
$3\frac{1}{2}$	..	51.8	42.5	52.6	43.1	53.3	43.8	54.1	44.4	54.9	45.0	55.7	45.7	..	$4\frac{1}{2}$
	40	51.3	43.1	52.1	43.7	52.9	44.4	53.6	45.0	54.4	45.6	55.2	46.3	50	
	41	50.6	44.0	51.3	44.6	52.1	45.3	52.8	45.9	53.6	46.6	54.3	47.2	49	
	42	49.8	44.8	50.5	45.5	51.3	46.2	52.0	46.8	52.8	47.5	53.5	48.2	48	
$3\frac{3}{4}$	..	49.6	45.0	50.4	45.7	51.1	46.3	51.9	47.0	52.6	47.7	53.3	48.3	..	$4\frac{1}{4}$
	43	49.0	45.7	49.7	46.4	50.5	47.1	51.2	47.7	51.9	48.4	52.7	49.1	47	
	44	48.2	46.5	48.9	47.2	49.6	47.9	50.4	48.6	51.1	49.3	51.8	50.0	46	
4	45	47.4	47.4	48.1	48.1	48.8	48.8	49.5	49.5	50.2	50.2	50.9	50.9	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		67		68		69		70		71		72			Rumos

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Rumos Pt.	Rumos Gr.	Distancia 73 Lt.	73 Ap.	74 Lt.	74 Ap.	75 Lt.	75 Ap.	76 Lt.	76 Ap.	77 Lt.	77 Ap.	78 Lt.	78 Ap.	Rumos Gr.	Rumos Pt.
	1	73.0	1.3	74.0	1.3	75.0	1.3	76.0	1.3	77.0	1.3	78.0	1.4	89	
	2	73.0	2.5	74.0	2.6	75.0	2.6	76.0	2.7	77.0	2.7	78.0	2.7	88	
1/4	..	72.9	3.6	73.9	3.6	74.9	3.7	75.9	3.7	76.9	3.8	77.9	3.8	..	7 3/4
	3	72.9	3.8	73.9	3.9	74.9	3.9	75.9	4.0	76.9	4.0	77.9	4.1	87	
	4	72.8	5.1	73.8	5.2	74.8	5.2	75.8	5.3	76.8	5.4	77.8	5.4	86	
	5	72.7	6.4	73.7	6.4	74.7	6.5	75.7	6.6	76.7	6.7	77.7	6.8	85	
1/2	..	72.6	7.2	73.6	7.3	74.6	7.4	75.6	7.4	76.6	7.5	77.6	7.6	..	7 1/2
	6	72.6	7.6	73.6	7.7	74.6	7.8	75.6	7.9	76.6	8.0	77.6	8.2	84	
	7	72.5	8.9	73.4	9.0	74.4	9.1	75.4	9.3	76.4	9.4	77.4	9.5	83	
	8	72.3	10.2	73.3	10.3	74.3	10.4	75.3	10.6	76.3	10.7	77.2	10.9	82	
3/4	.	72.2	10.7	73.2	10.9	74.2	11.0	75.2	11.1	76.2	11.3	77.2	11.4	..	7 1/4
	9	72.1	11.4	73.1	11.6	74.1	11.7	75.1	11.9	76.1	12.0	77.0	12.2	81	
	10	71.9	12.7	72.9	12.8	73.9	13.0	74.8	13.2	75.8	13.4	76.8	13.5	80	
	11	71.7	13.9	72.6	14.1	73.6	14.3	74.6	14.5	75.6	14.7	76.6	14.9	79	
1	..	71.6	14.2	72.6	14.4	73.6	14.6	74.5	14.8	75.5	15.0	76.5	15.2	..	7
	12	71.4	15.2	72.4	15.4	73.4	15.6	74.3	15.8	75.3	16.0	76.3	16.2	78	
	13	71.1	16.4	72.1	16.6	73.1	16.9	74.1	17.1	75.0	17.3	76.0	17.5	77	
	14	70.8	17.7	71.8	17.9	72.8	18.1	73.7	18.4	74.7	18.6	75.7	18.9	76	
1 1/4	.	70.8	17.7	71.8	18.0	72.8	18.2	73.7	18.5	74.7	18.7	75.7	19.0	..	6 3/4
	15	70.5	18.9	71.5	19.2	72.4	19.4	73.4	19.7	74.4	19.9	75.3	20.2	75	
	16	70.2	20.1	71.1	20.4	72.1	20.7	73.1	20.9	74.0	21.2	75.0	21.5	74	
1 1/2	.	69.9	21.2	70.8	21.5	71.8	21.8	72.7	22.1	73.7	22.3	74.6	22.6	..	6 1/2
	17	69.8	21.3	70.8	21.6	71.7	21.9	72.7	22.2	73.6	22.5	74.6	22.8	73	
	18	69.4	22.6	70.4	22.9	71.3	23.2	72.3	23.5	73.2	23.8	74.2	24.1	72	
	19	69.0	23.8	70.9	24.1	70.9	24.4	71.9	24.7	72.8	25.1	73.8	25.4	71	
1 3/4	..	68.7	24.6	69.7	24.9	70.6	25.3	71.6	25.6	72.5	25.9	73.4	26.3	..	6 1/4
	20	68.6	25.0	69.5	25.3	70.5	25.7	71.4	26.0	72.4	26.3	73.3	26.7	70	
	21	68.2	26.2	69.1	26.5	70.0	26.9	71.0	27.2	71.9	27.6	72.8	28.0	69	
	22	67.7	27.3	68.6	27.7	69.5	28.1	70.5	28.5	71.4	28.8	72.3	29.2	68	
2	..	67.4	27.9	68.4	28.3	69.3	28.7	70.2	29.1	71.1	29.5	72.1	29.9	..	6
	23	67.2	28.5	68.1	28.9	69.0	29.3	70.0	29.7	70.9	30.1	71.8	30.5	67	
	24	66.7	29.7	67.6	30.1	68.5	30.5	69.4	30.9	70.3	31.3	71.3	31.7	66	
	25	66.2	30.9	67.1	31.3	68.0	31.7	68.9	32.1	69.8	32.5	70.7	33.0	65	
2 1/4	..	66.0	31.2	66.9	31.6	67.8	32.1	68.7	32.5	69.6	32.9	70.5	33.4	..	5 3/4
	26	65.6	32.0	66.5	32.4	67.4	32.9	68.3	33.3	69.2	33.8	70.1	34.2	64	
	27	65.0	33.1	65.9	33.6	66.8	34.0	67.7	34.5	68.6	35.0	69.5	35.4	63	
	28	64.5	34.3	65.3	34.7	66.2	35.2	67.1	35.7	68.0	36.1	68.9	36.6	62	
2 1/2	..	64.4	34.4	65.3	34.9	66.1	35.4	67.0	35.8	67.9	36.3	68.8	36.8	..	5 1/2
	29	63.8	35.4	64.7	35.9	65.6	36.4	66.5	36.8	67.3	37.3	68.2	37.8	61	
	30	63.2	36.5	64.1	37.0	65.0	37.5	65.8	38.0	66.7	38.5	67.5	39.0	60	
2 3/4	..	62.6	37.5	63.5	38.0	64.3	38.6	65.2	39.1	66.0	39.6	66.9	40.1	..	5 1/4
	31	62.6	37.6	63.4	38.1	64.3	38.6	65.1	39.1	66.0	39.7	66.9	40.2	59	
	32	61.9	38.7	62.8	39.2	63.6	39.7	64.5	40.3	65.3	40.8	66.1	41.3	58	
	33	61.2	39.8	62.1	40.3	62.9	40.8	63.7	41.4	64.6	41.9	65.4	42.5	57	
3	..	60.7	40.6	61.5	41.1	62.4	41.7	63.2	42.2	64.0	42.8	64.8	43.3	..	5
	34	60.5	40.8	61.3	41.4	62.2	41.9	63.0	42.5	63.8	43.1	64.7	43.6	56	
	35	59.8	41.9	60.6	42.4	61.4	43.0	62.3	43.6	63.1	44.2	63.9	44.7	55	
	36	59.1	42.9	59.9	43.5	60.7	44.1	61.5	44.7	62.3	45.3	63.1	45.8	54	
3 1/4	..	58.6	43.5	59.7	44.1	60.2	44.7	61.0	45.3	61.8	45.9	62.6	46.5	..	4 3/4
	37	58.3	43.9	59.1	44.5	59.9	45.1	60.7	45.7	61.5	46.3	62.3	46.9	53	
	38	57.5	44.9	58.3	45.6	59.1	46.2	59.9	46.8	60.7	47.4	61.5	48.0	52	
	39	56.7	45.9	57.5	46.6	58.3	47.2	59.1	47.8	59.8	48.5	60.6	49.1	51	
3 1/2	..	56.4	46.3	57.2	46.9	58.0	47.6	58.7	48.2	59.5	48.8	60.3	49.5	..	4 1/2
	40	55.9	46.9	56.7	47.6	57.5	48.2	58.2	48.9	59.0	49.5	59.8	50.1	50	
	41	55.1	47.9	55.8	48.5	56.6	49.2	57.4	49.9	58.1	50.5	58.9	51.2	49	
	42	54.2	48.8	55.0	49.5	55.7	50.2	56.5	50.9	57.2	51.5	58.0	52.2	48	
3 3/4	..	54.1	49.0	54.8	49.7	55.6	50.4	56.3	51.0	57.0	51.7	57.8	52.4	..	4 1/4
	43	53.4	49.8	54.1	50.5	54.9	51.1	55.6	51.8	56.3	52.5	57.0	53.2	47	
	44	52.5	50.7	53.2	51.4	54.0	52.1	54.7	52.8	55.4	53.5	56.1	54.2	46	
4	45	51.6	51.6	52.3	52.3	53.0	53.0	53.7	53.7	54.4	54.4	55.2	55.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		73		74		75		76		77		78			Rumos

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Rumos Pt.	Gr.	Distancia 79 Lt.	79 Ap.	80 Lt.	80 Ap.	81 Lt.	81 Ap.	82 Lt.	82 Ap.	83 Lt.	83 Ap.	84 Lt.	84 Ap.	Gr.	Rumos Pt.
	1	79.0	1.4	80.0	1.4	81.0	1.4	82.0	1.4	83.0	1.4	84.0	1.5	89	
$\frac{1}{4}$	2	79.0	2.8	80.0	2.8	81.0	2.8	82.0	2.9	82.9	2.9	83.9	2.9	88	
	..	78.9	3.9	79.9	3.9	80.9	4.0	81.9	4.0	82.9	4.1	83.9	4.1	..	$7\frac{3}{4}$
	3	78.9	4.1	79.9	4.2	80.9	4.2	81.9	4.3	82.9	4.3	83.9	4.4	87	
	4	78.8	5.5	79.8	5.6	80.8	5.7	81.8	5.7	82.8	5.8	83.8	5.9	86	
	5	78.7	6.9	79.7	7.0	80.7	7.1	81.7	7.1	82.7	7.2	83.7	7.3	85	
$\frac{1}{2}$	..	78.6	7.7	79.6	7.8	80.6	7.9	81.6	8.0	82.6	8.1	83.6	8.2	..	$7\frac{1}{2}$
	6	78.6	8.3	79.6	8.4	80.6	8.5	81.6	8.6	82.5	8.7	83.5	8.8	84	
	7	78.4	9.6	79.4	9.7	80.4	9.9	81.4	10.0	82.4	10.1	83.4	10.2	83	
	8	78.2	11.0	79.2	11.1	80.2	11.3	81.2	11.4	82.2	11.6	83.2	11.7	82	
$\frac{3}{4}$	..	78.1	11.6	79.1	11.7	80.1	11.9	81.1	12.0	82.1	12.2	83.1	12.3	..	$7\frac{1}{4}$
	9	78.0	12.4	79.0	12.5	80.0	12.7	81.0	12.8	82.0	13.0	83.0	13.1	81	
	10	77.8	13.7	78.8	13.9	79.8	14.1	80.8	14.2	81.7	14.4	82.7	14.6	80	
	11	77.5	15.1	78.5	15.3	79.5	15.5	80.5	15.6	81.5	15.8	82.5	16.0	79	
1	..	77.5	15.4	78.5	15.6	79.4	15.8	80.4	16.0	81.4	16.2	82.4	16.4	..	7
	12	77.3	16.4	78.3	16.6	79.2	16.8	80.2	17.0	81.2	17.3	82.2	17.5	78	
	13	77.0	17.8	77.9	18.0	78.9	18.2	79.9	18.4	80.9	18.7	81.8	18.9	77	
	14	76.7	19.1	77.6	19.4	78.6	19.6	79.0	19.8	80.5	20.1	81.5	20.3	76	
$1\frac{1}{4}$	..	76.0	19.2	77.6	19.4	78.6	19.7	79.5	19.9	80.5	20.2	81.5	20.4	..	$6\frac{3}{4}$
	15	76.3	20.4	77.3	20.7	78.2	21.0	79.2	21.2	80.2	21.5	81.1	21.7	75	
	16	75.9	21.8	76.9	22.1	77.9	22.3	78.8	22.6	79.8	22.9	80.7	23.2	74	
$1\frac{1}{2}$	..	75.6	22.9	76.6	23.2	77.5	23.5	78.5	23.8	79.4	24.1	80.4	24.4	..	$6\frac{1}{2}$
	17	75.5	23.1	76.5	23.4	77.5	23.7	78.4	24.0	79.4	24.3	80.3	24.6	73	
	18	75.1	24.4	76.1	24.7	77.0	25.0.	78.0	25.3	78.9	25.6	79.9	26.0	72	
	19	74.7	25.7	75.6	26.0	76.6	26.4	77.5	26.7	78.5	27.0	79.4	27.3	71	
$1\frac{3}{4}$	..	74.4	26.6	75.3	26.9	76.3	27.3	77.2	27.6	78.1	28.0	79.1	28.3	..	$6\frac{1}{4}$
	20	74.2	27.0	75.2	27.4	76.1	27.7	77.1	28.0	78.0	28.4	78.9	28.7	70	
	21	73.8	28.3	74.7	28.7	75.6	29.0	76.6	29.4	77.5	29.7	78.4	30.1	69	
	22	73.2	29.6	74.2	30.0	75.1	30.3	76.0	30.7	77.0	31.1	77.9	31.5	68	
2	..	73.0	30.2	73.9	30.6	74.8	31.0	75.8	31.4	76.7	31.8	77.6	32.1	..	6
	23	72.7	30.9	73.6	31.3	74.6	31.6	75.5	32.0	76.4	32.4	77.3	32.8	67	
	24	72.2	32.1	73.1	32.5	74.0	32.9	74.9	33.4	75.8	33.8	76.7	34.2	66	
	25	71.6	33.4	72.5	33.8	73.4	34.2	74.3	34.7	75.2	35.1	76.1	35.5	65	
$2\frac{1}{4}$	..	71.4	33.8	72.3	34.2	73.2	34.6	74.1	35.1	75.0	35.5	75.9	35.9	..	$5\frac{3}{4}$
	26	71.0	34.6	71.9	35.1	72.8	35.5	73.7	35.9	74.6	36.4	75.5	36.8	64	
	27	70.4	35.9	71.3	36.3	72.2	36.8	73.1	37.2	74.0	37.7	74.8	38.1	63	
	28	69.8	37.1	70.6	37.6	71.5	38.0	72.4	38.5	73.3	39.0	74.2	39.4	62	
$2\frac{1}{2}$	..	69.7	37.2	70.6	37.7	71.4	38.2	72.3	38.6	73.2	39.1	74.1	39.6	..	$5\frac{1}{2}$
	29	69.1	38.3	70.0	38.8	70.8	39.3	71.7	39.8	72.6	40.2	73.5	40.7	61	
	30	68.4	39.5	69.3	40.0	70.1	40.5	71.0	41.0	71.9	41.5	72.7	42.0	60	
$2\frac{3}{4}$	..	67.8	40.6	68.6	41.1	69.5	41.6	70.3	42.2	71.2	42.7	72.0	43.2	..	$5\frac{1}{4}$
	31	67.7	40.7	68.6	41.2	69.4	41.7	70.3	42.2	71.1	42.7	72.0	43.3	59	
	32	67.0	41.9	67.8	42.4	68.7	42.9	69.5	43.5	70.4	44.0	71.2	44.5	58	
	33	66.3	43.0	67.1	43.6	67.9	44.1	68.8	44.7	69.6	45.2	70.4	45.7	57	
3	..	65.7	43.9	66.5	44.4	67.3	45.0	68.2	45.6	69.0	46.1	69.8	46.7	..	5
	34	65.5	44.2	66.3	44.7	67.2	45.3	68.0	45.9	68.8	46.4	69.6	47.0	56	
	35	64.7	45.3	65.5	45.9	66.4	46.5	67.2	47.0	68.0	47.6	68.8	48.2	55	
	36	63.9	46.4	64.7	47.0	65.5	47.6	66.3	48.2	67.1	48.8	68.0	49.4	54	
$3\frac{1}{4}$	..	63.4	47.1	64.3	47.7	65.1	48.3	65.9	48.9	66.7	49.4	67.5	50.0	..	$4\frac{3}{4}$
	37	63.1	47.5	63.9	48.1	64.7	48.7	65.5	49.3	66.3	50.0	67.1	50.6	53	
	38	62.3	48.6	63.0	49.3	63.8	49.9	64.6	50.5	65.4	51.1	66.2	51.7	52	
	39	61.4	49.7	62.2	50.3	62.9	51.0	63.7	51.6	64.5	52.2	65.3	52.9	51	
$3\frac{1}{2}$	..	61.1	50.1	61.8	50.7	62.6	51.4	63.4	52.0	64.2	52.7	64.9	53.3	..	$4\frac{1}{2}$
	40	60.5	50.8	61.3	51.4	62.0	52.1	62.8	52.7	63.6	53.4	64.3	54.0	50	
	41	59.6	51.8	60.4	52.5	61.1	53.1	61.9	53.8	62.6	54.5	63.4	55.1	49	
	42	58.7	52.9	59.5	53.5	60.2	54.2	60.9	54.9	61.7	55.5	62.4	56.2	48	
$3\frac{3}{4}$	..	58.5	53.0	59.3	53.7	60.0	54.4	60.8	55.1	61.5	55.7	62.2	56.4	..	$4\frac{1}{4}$
	43	57.8	53.9	58.5	54.6	59.2	55.2	60.0	55.9	60.7	56.6	61.4	57.3	47	
	44	56.8	54.9	57.5	55.6	58.3	56.3	59.0	57.0	59.7	57.7	60.4	58.4	46	
4	45	55.9	55.9	56.6	56.6	57.3	57.3	58.0	58.0	58.7	58.7	59.4	59.4	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		79		80		81		82		83		84			Rumos

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Rumos Pt.	Rumos Gr.	Distancia 85 Lt.	85 Ap.	86 Lt.	86 Ap.	87 Lt.	87 Ap.	88 Lt.	88 Ap.	89 Lt.	89 Ap.	90 Lt.	90 Ap.	Rumos Gr.	Rumos Pt.
	1	85.0	1.5	86.0	1.5	87.0	1.5	88.0	1.5	89.0	1.6	90.0	1.6	89	
	2	84.9	3.0	85.9	3.0	86.9	3.0	87.9	3.1	88.9	3.1	89.9	3.1	88	
1/4	..	84.9	4.2	85.9	4.2	86.9	4.3	87.9	4.3	88.9	4.4	89.9	4.4	..	7 3/4
	3	84.9	4.4	85.9	4.5	86.9	4.6	87.9	4.6	88.9	4.7	89.9	4.7	87	
	4	84.8	5.9	85.8	6.0	86.8	6.1	87.8	6.1	88.8	6.2	89.8	6.3	86	
	5	84.7	7.4	85.7	7.5	86.7	7.6	87.7	7.7	88.7	7.8	89.7	7.8	85	
1/2	..	84.6	8.3	85.6	8.4	86.6	8.5	87.6	8.6	88.6	8.7	89.6	8.8	..	7 1/2
	6	84.5	8.9	85.5	9.0	86.5	9.1	87.5	9.3	88.5	9.3	89.5	9.4	84	
	7	84.4	10.4	85.4	10.5	86.4	10.6	87.3	10.7	88.3	10.8	89.3	11.0	83	
	8	84.2	11.8	85.2	12.0	86.2	12.1	87.1	12.2	88.1	12.4	89.1	12.5	82	
3/4	..	84.1	12.5	85.1	12.6	86.1	12.8	87.0	12.9	88.0	13.1	89.0	13.2	..	7 1/4
	9	84.0	13.3	84.9	13.5	85.9	13.6	86.9	13.8	87.9	13.9	88.9	14.1	81	
	10	83.7	14.8	84.7	14.9	85.7	15.1	86.7	15.3	87.6	15.5	88.6	15.6	80	
	11	83.4	16.2	84.4	16.4	85.4	16.6	86.4	16.8	87.4	17.0	88.3	17.2	79	
1	..	83.4	16.6	84.3	16.8	85.3	17.0	86.3	17.2	87.3	17.4	88.3	17.6	..	7
	12	83.1	17.7	84.1	17.9	85.1	18.1	86.1	18.3	87.1	18.5	88.0	18.7	78	
	13	82.8	19.1	83.8	19.3	84.8	19.6	85.7	19.8	86.7	20.0	87.7	20.2	77	
	14	82.5	20.6	83.4	20.8	84.4	21.0	85.4	21.3	86.4	21.5	87.3	21.8	76	
1 1/4	..	82.5	20.7	83.4	20.9	84.4	21.1	85.4	21.4	86.3	21.6	87.3	21.9	..	6 3/4
	15	82.1	22.0	83.1	22.3	84.0	22.5	85.0	22.8	86.0	23.0	86.9	23.3	75	
	16	81.7	23.4	82.7	23.7	83.6	24.0	84.6	24.3	85.6	24.5	86.5	24.8	74	
1 1/2	..	81.3	24.7	82.3	25.0	83.3	25.2	84.2	25.5	85.2	25.8	86.1	26.1	..	6 1/2
	17	81.3	24.9	82.2	25.1	83.2	25.4	84.2	25.7	85.1	26.0	86.1	26.3	73	
	18	80.8	26.3	81.8	26.6	82.7	26.9	83.7	27.2	84.6	27.5	85.6	27.8	72	
	19	80.4	27.7	81.3	28.0	82.3	28.3	83.2	28.7	84.2	29.0	85.1	29.3	71	
1 3/4	..	80.0	28.6	81.0	29.0	81.9	29.3	82.9	29.6	83.8	30.0	84.7	30.3	..	6 1/4
	20	79.9	29.1	80.8	29.4	81.8	29.8	82.7	30.1	83.6	30.4	84.6	30.8	70	
	21	79.4	30.5	80.3	30.8	81.2	31.2	82.2	31.5	83.1	31.9	84.0	32.3	69	
	22	78.8	31.8	79.7	32.2	80.7	32.6	81.6	33.0	82.5	33.3	83.4	33.7	68	
2	..	78.5	32.5	79.5	32.9	80.4	33.3	81.3	33.7	82.2	34.1	83.2	34.4	..	6
	23	78.2	33.2	79.2	33.6	80.1	34.0	81.0	34.4	81.9	34.8	82.8	35.2	67	
	24	77.7	34.6	78.6	35.0	79.5	35.4	80.4	35.8	81.3	36.2	82.2	36.6	66	
	25	77.0	35.9	77.9	36.3	78.8	36.8	79.8	37.2	80.7	37.6	81.6	38.0	65	
2 1/4	..	76.8	36.3	77.7	36.8	78.6	37.2	79.6	37.6	80.5	38.1	81.4	38.5	..	5 3/4
	26	76.4	37.3	77.3	37.7	78.2	38.1	79.1	38.6	80.0	39.0	80.9	39.5	64	
	27	75.7	38.6	76.6	39.0	77.5	39.5	78.4	40.0	79.3	40.4	80.2	40.9	63	
	28	75.1	39.9	75.9	40.4	76.8	40.8	77.7	41.3	78.6	41.8	79.5	42.3	62	
2 1/2	..	75.0	40.1	75.9	40.5	76.7	41.0	77.6	41.5	78.5	41.9	79.4	42.4	..	5 1/2
	29	74.3	41.2	75.2	41.7	76.1	42.2	77.0	42.7	77.8	43.1	78.7	43.6	61	
	30	73.6	42.5	74.5	43.0	75.3	43.5	76.2	44.0	77.1	44.5	77.9	45.0	60	
2 3/4	..	72.9	43.7	73.8	44.2	74.6	44.7	75.5	45.2	76.3	45.7	77.2	46.3	..	5 1/4
	31	72.9	43.8	73.7	44.3	74.6	44.8	75.4	45.3	76.3	45.8	77.1	46.4	59	
	32	72.1	45.0	72.9	45.6	73.8	46.1	74.6	46.6	75.5	47.2	76.3	47.3	58	
	33	71.3	46.3	72.1	46.8	73.0	47.4	73.8	47.9	74.6	48.5	75.5	49.0	57	
3	..	70.7	47.2	71.5	47.8	72.3	48.3	73.2	48.9	74.0	49.4	74.8	50.0	..	5
	34	70.5	47.5	71.3	48.1	72.1	48.6	73.0	49.2	73.8	49.8	74.6	50.3	56	
	35	69.6	48.8	70.4	49.3	71.3	49.9	72.1	50.5	72.9	51.0	73.7	51.6	55	
	36	68.8	50.0	69.6	50.5	70.4	51.1	71.2	51.7	72.0	52.3	72.8	52.9	54	
3 1/4	..	68.3	50.6	69.1	51.2	69.9	51.8	70.7	52.4	71.5	53.0	72.3	53.6	..	4 3/4
	37	67.9	51.2	68.7	51.8	69.5	52.4	70.3	53.0	71.1	53.6	71.9	54.2	53	
	38	67.0	52.3	67.8	52.9	68.6	53.6	69.3	54.2	70.1	54.8	70.9	55.4	52	
	39	66.1	53.5	66.8	54.1	67.6	54.8	68.4	55.4	69.2	56.0	69.9	56.6	51	
3 1/2	..	65.7	53.9	66.5	54.6	67.2	55.2	68.0	55.8	68.8	56.5	69.6	57.1	..	4 1/2
	40	65.1	54.6	65.9	55.3	66.6	55.9	67.4	56.6	68.2	57.2	68.9	57.9	50	
	41	64.2	55.8	64.9	56.4	65.7	57.1	66.4	57.7	67.2	58.4	67.9	59.0	49	
	42	63.2	56.9	63.9	57.5	64.7	58.2	65.4	58.9	66.1	59.6	66.9	60.2	48	
3 3/4	..	63.0	57.1	63.7	57.7	64.5	58.4	65.2	59.1	65.9	59.8	66.7	60.4	..	4 1/4
	43	62.2	58.0	62.9	58.7	63.6	59.3	64.4	60.0	65.1	60.7	65.8	61.4	47	
	44	61.1	59.0	61.9	59.7	62.6	60.4	63.3	61.1	64.0	61.8	64.7	62.5	46	
4	45	60.1	60.1	60.8	60.8	61.5	61.5	62.2	62.2	62.9	62.9	63.6	63.6	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		85		86		87		88		89		90			Rumos

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Rumos Pt.	Rumos Gr.	Distancia 91 Lt.	91 Ap.	92 Lt.	92 Ap.	93 Lt.	93 Ap.	94 Lt.	94 Ap.	95 Lt.	95 Ap.	96 Lt.	96 Ap.	Rumos Gr.	Rumos Pt.
	1	91.0	1.6	92.0	1.6	93.0	1.6	94.0	1.6	95.0	1.7	96.0	1.7	89	
1/4	2	90.9	3.2	91.9	3.2	92.9	3.2	93.9	3.3	94.9	3.3	95.9	3.4	88	
	..	90.9	4.5	91.9	4.5	92.9	4.6	93.9	4.6	94.9	4.7	95.9	4.7	..	7 3/4
	3	90.9	4.8	91.9	4.8	92.9	4.9	93.9	4.9	94.9	5.0	95.9	5.0	87	
	4	90.8	6.3	91.8	6.4	92.8	6.5	93.8	6.6	94.8	6.6	95.8	6.7	86	
	5	90.7	7.9	91.6	8.0	92.6	8.1	93.6	8.2	94.6	8.3	95.6	8.4	85	
1/2	..	90.6	8.9	91.6	9.0	92.6	9.1	93.5	9.2	94.5	9.3	95.5	9.4	..	7 1/2
	6	90.5	9.6	91.5	9.6	92.5	9.7	93.5	9.8	94.5	9.9	95.5	10.0	84	
	7	90.3	11.1	91.3	11.2	92.3	11.3	93.3	11.5	94.3	11.6	95.3	11.7	83	
	8	90.1	12.7	91.1	12.8	92.1	12.9	93.1	13.1	94.1	13.2	95.1	13.4	82	
3/4	..	90.0	13.3	91.0	13.5	92.0	13.6	93.0	13.8	94.0	13.9	95.0	14.1	..	7 1/4
	9	89.9	14.2	90.9	14.4	91.9	14.5	92.8	14.7	93.8	14.9	94.8	15.0	81	
	10	89.6	15.8	90.6	16.0	91.6	16.1	92.6	16.3	93.6	16.5	94.5	16.7	80	
	11	89.3	17.4	90.3	17.6	91.3	17.7	92.3	17.9	93.3	18.1	94.2	18.3	79	
1	..	89.2	17.8	90.2	18.0	91.2	18.1	92.2	18.3	93.2	18.5	94.2	18.7	..	7
	12	89.0	18.9	90.0	19.1	91.0	19.3	91.9	19.5	92.9	19.8	93.9	20.0	78	
	13	88.7	20.5	89.6	20.7	90.6	20.9	91.6	21.1	92.6	21.4	93.5	21.6	77	
	14	88.3	22.0	89.3	22.3	90.2	22.5	91.2	22.7	92.2	23.0	93.1	23.2	76	
1 1/4	..	88.3	22.1	89.2	22.4	90.2	22.6	91.2	22.8	92.2	23.1	93.1	23.3	..	6 3/4
	15	87.9	23.6	88.9	23.8	89.8	24.1	90.8	24.3	91.8	24.6	92.7	24.8	75	
	16	87.5	25.1	88.4	25.4	89.4	25.6	90.4	25.9	91.3	26.2	92.3	26.5	74	
1 1/2	..	87.1	26.4	88.0	26.7	89.0	27.0	90.0	27.3	90.9	27.6	91.9	27.9	..	6 1/2
	17	87.0	26.6	88.0	26.9	88.9	27.2	89.9	27.5	90.8	27.8	91.8	28.1	73	
	18	86.5	28.1	87.5	28.4	88.4	28.7	89.4	29.0	90.4	29.4	91.3	29.7	72	
	19	86.0	29.6	87.0	30.0	87.9	30.3	88.9	30.6	89.8	30.9	90.8	31.3	71	
1 3/4	..	85.7	30.7	86.6	31.0	87.6	31.3	88.5	31.7	89.4	32.0	90.4	32.3	..	6 1/4
	20	85.5	31.1	86.5	31.5	87.4	31.8	88.3	32.1	89.3	32.5	90.2	32.8	70	
	21	85.0	32.6	85.9	33.0	86.8	33.3	87.8	33.7	88.7	34.0	89.6	34.4	69	
	22	84.4	34.1	85.3	34.5	86.2	34.8	87.2	35.2	88.1	35.6	89.0	36.0	68	
2	..	84.1	34.8	85.0	35.2	85.9	35.6	86.8	36.0	87.8	36.4	88.7	36.7	..	6
	23	83.8	35.6	84.7	35.9	85.6	36.3	86.5	36.7	87.4	37.1	88.4	37.5	67	
	24	83.1	37.0	84.0	37.4	85.0	37.8	85.9	38.2	86.8	38.6	87.7	39.0	66	
	25	82.5	38.5	83.4	38.9	84.3	39.3	85.2	39.7	86.1	40.1	87.0	40.6	65	
2 1/4	..	82.3	38.9	83.2	39.3	84.1	39.8	85.0	40.2	85.9	40.6	86.8	41.1	..	5 3/4
	26	81.8	39.9	82.7	40.3	83.6	40.8	84.5	41.2	85.4	41.6	86.3	42.1	64	
	27	81.1	41.3	82.0	41.8	82.9	42.2	83.8	42.7	84.6	43.1	85.5	43.6	63	
	28	80.3	42.7	81.2	43.2	82.1	43.7	83.0	44.1	83.9	44.6	84.8	45.1	62	
2 1/2	..	80.3	42.9	81.1	43.4	82.0	43.8	82.9	44.3	83.8	44.8	84.7	45.2	..	5 1/2
	29	79.6	44.1	80.5	44.6	81.3	45.1	82.2	45.6	83.1	46.1	84.0	46.5	61	
	30	78.8	45.5	79.7	46.0	80.5	46.5	81.4	47.0	82.3	47.5	83.1	48.0	60	
2 3/4	..	78.1	46.8	78.9	47.3	79.8	47.8	80.6	48.3	81.5	48.8	82.3	49.3	..	5 1/4
	31	78.0	46.9	78.9	47.4	79.7	47.9	80.6	48.4	81.4	48.9	82.3	49.4	59	
	32	77.2	48.2	78.0	48.8	78.9	49.3	79.7	49.8	80.6	50.3	81.4	50.9	58	
	33	76.3	49.6	77.2	50.1	78.0	50.7	78.8	51.2	79.7	51.7	80.5	52.3	57	
3	..	75.7	50.6	76.5	51.1	77.3	51.7	78.2	52.2	79.0	52.8	79.8	53.3	..	5
	34	75.4	50.9	76.3	51.4	77.1	52.0	77.9	52.6	78.8	53.1	79.6	53.7	56	
	35	74.5	52.2	75.4	52.8	76.2	53.3	77.0	53.9	77.8	54.5	78.6	55.1	55	
	36	73.6	53.5	74.4	54.1	75.2	54.7	76.0	55.3	76.9	55.8	77.7	56.4	54	
3 1/4	..	73.1	54.2	73.9	54.8	74.7	55.4	75.5	56.0	76.3	56.6	77.1	57.2	..	4 3/4
	37	72.7	54.8	73.5	55.4	74.3	56.0	75.1	56.6	75.9	57.2	76.7	57.8	53	
	38	71.7	56.0	72.5	56.6	73.3	57.3	74.1	57.9	74.9	58.5	75.6	59.1	52	
	39	70.7	57.3	71.5	57.9	72.3	58.5	73.1	59.2	73.8	59.8	74.6	60.4	51	
3 1/2	..	70.3	57.7	71.1	58.4	71.9	59.0	72.7	59.6	73.4	60.3	74.2	60.9	..	4 1/2
	40	69.7	58.5	70.5	59.1	71.2	59.8	72.0	60.4	72.8	61.1	73.5	61.7	50	
	41	68.7	59.7	69.4	60.4	70.2	61.0	70.9	61.7	71.7	62.3	72.5	63.0	49	
	42	67.6	60.9	68.4	61.6	69.1	62.2	69.9	62.9	70.6	63.6	71.3	64.2	48	
3 3/4	..	67.4	61.1	68.2	61.8	68.9	62.4	69.6	63.1	70.4	63.8	71.1	64.5	..	4 1/4
	43	66.6	62.1	67.3	62.7	68.0	63.4	68.7	64.1	69.5	64.8	70.2	65.5	47	
	44	65.5	63.2	66.2	63.9	66.9	64.6	67.6	65.3	68.3	66.0	69.1	66.7	46	
4	45	64.3	64.3	65.1	65.1	65.8	65.8	66.5	66.5	67.2	67.2	67.9	67.9	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		91		92		93		94		95		96		Rumos	

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Rumos		Distancia												Rumos
		97		98		99		100		101		102		
Pt.	Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
	1	97.0	1.7	98.0	1.7	99.0	1.7	100.0	1.7	101.0	1.8	102.0	1.8	89	
$\frac{1}{4}$	2	96.9	3.4	97.9	3.4	98.9	3.5	99.9	3.5	100.9	3.5	101.9	3.6	88	
	..	96.9	4.8	97.9	4.8	98.9	4.9	99.9	4.9	100.9	5.0	101.9	5.0	..	$7\frac{3}{4}$
	3	96.9	5.1	97.9	5.1	98.9	5.2	99.9	5.2	100.9	5.3	101.9	5.3	87	
	4	96.8	6.8	97.8	6.8	98.8	6.9	99.8	7.0	100.8	7.0	101.8	7.1	86	
	5	96.6	8.5	97.6	8.5	98.6	8.6	99.6	8.7	100.6	8.8	101.6	8.9	85	
$\frac{1}{2}$	..	96.5	9.5	97.5	9.6	98.5	9.7	99.5	9.8	100.5	9.9	101.5	10.0	..	$7\frac{1}{2}$
	6	96.5	10.1	97.5	10.2	98.5	10.3	99.5	10.5	100.4	10.6	101.4	10.7	84	
	7	96.3	11.8	97.3	11.9	98.3	12.1	99.3	12.2	100.2	12.3	101.2	12.4	83	
	8	96.1	13.5	97.0	13.6	98.0	13.8	99.0	13.9	100.0	14.1	101.0	14.2	82	
$\frac{3}{4}$	..	95.9	14.2	96.9	14.4	97.9	14.5	98.9	14.7	99.9	14.8	100.9	15.0	..	$7\frac{1}{4}$
	9	95.8	15.2	96.8	15.3	97.8	15.5	98.8	15.6	99.8	15.8	100.7	16.0	81	
	10	95.5	16.8	96.5	17.0	97.5	17.2	98.5	17.4	99.5	17.5	100.5	17.7	80	
	11	95.2	18.5	96.2	18.7	97.2	18.9	98.2	19.1	99.1	19.3	100.1	19.5	79	
1	..	95.1	18.9	96.1	19.1	97.1	19.3	98.1	19.5	99.1	19.7	100.0	19.9	..	7
	12	94.9	20.2	95.9	20.4	96.8	20.6	97.8	20.8	98.8	21.0	99.8	21.2	78	
	13	94.5	21.8	95.5	22.0	96.5	22.3	97.4	22.5	98.4	22.7	99.4	22.9	77	
	14	94.1	23.5	95.1	23.7	96.1	24.0	97.0	24.2	98.0	24.4	99.0	24.7	76	
$1\frac{1}{4}$	..	94.1	23.6	95.1	23.8	96.0	24.1	97.0	24.3	98.0	24.5	98.9	24.8	..	$6\frac{3}{4}$
	15	93.7	25.1	94.7	25.4	95.6	25.6	96.6	25.9	97.6	26.1	98.5	26.4	75	
	16	93.2	26.7	94.2	27 0	95.2	27.3	96.1	27.6	97.1	27.8	98.0	28.1	74	
$1\frac{1}{2}$	..	92.8	28.2	93.8	28.4	94.7	28.7	95.7	29.0	96.7	29.3	97.6	29.6	..	$6\frac{1}{2}$
	17	92.8	28.4	93.7	28.7	94.7	28.9	95.6	29.2	96.6	29.5	97.5	29.8	73	
	18	92.3	30.0	93.2	30.3	94.2	30.6	95.1	30.9	96.1	31.2	97.0	31.5	72	
	19	91.7	31.6	92.7	31.9	93.6	32.2	94.6	32.6	95.5	32.9	96.4	33.2	71	
$1\frac{3}{4}$	..	91.3	32.7	92.3	33.0	93.2	33 3	94.2	33.7	95.1	34.0	96.0	34.4	..	$6\frac{1}{4}$
	20	91.2	33.2	92.1	33.5	93.0	33.9	94.0	34.2	94.9	34.5	95.8	34.9	70	
	21	90.6	34.8	91.5	35.1	92.4	35.5	93.4	35.8	94.3	36.2	95.2	36.6	69	
	22	89.9	36.3	90.9	36.7	91.8	37.1	92.7	37.5	93.6	37.8	94.6	38.2	68	
2	..	89.6	37.1	90.5	37.5	91.5	37.9	92.4	38.3	93.3	38.7	94.2	39.0	..	6
	23	89.3	37.9	90.2	38.3	91.1	38.7	92.1	39.1	93.0	39.5	93.9	39.9	67	
	24	88.6	39.5	89.5	39.9	90.4	40.3	91.4	40.7	92.3	41.1	93.2	41.5	66	
	25	87.9	41.0	88.8	41.4	89.7	41.8	90.6	42.3	91.5	42.7	92.4	43.1	65	
$2\frac{1}{4}$	..	87.7	41.5	88.6	41.9	89.5	42.3	90.4	42.8	91.3	43.2	92.2	43.6	..	$5\frac{3}{4}$
	26	87.2	42.5	88.1	43.0	89.0	43.4	88.9	43.8	90.8	44.3	91.7	44.7	64	
	27	86.4	44.0	87.3	44.5	88.2	44.9	89.1	45.4	90.0	45.9	90.9	46.3	63	
	28	85.6	45.5	86.5	46.0	87.4	46.5	88.3	46.9	89.2	47.4	90.1	47.9	62	
$2\frac{1}{2}$	..	85.6	45.7	86.4	46.2	87.3	46.7	88.2	47.1	89.1	47.6	90.0	48 1	..	$5\frac{1}{2}$
	29	84.8	47.0	85.7	47.5	86.6	48.0	87.5	48.5	88.3	49.0	89.2	49.5	61	
	30	84.0	48.5	84.9	49.0	85.7	49.5	86.6	50.0	87.5	50.5	88.3	51.0	60	
$2\frac{3}{4}$	..	83.2	49.9	84.1	50.4	84.9	50.9	85.8	51.4	86.6	51.9	87.5	52.4	..	$5\frac{1}{4}$
	31	83.1	50.0	84.0	50.5	84.9	51.0	85.7	51.5	86.6	52.0	87.4	52.5	59	
	32	82.3	51.4	83.1	51.9	84.0	52.5	84.8	53.0	85.7	53.5	86.5	54.1	58	
	33	81.4	52.8	82.2	53.4	83.0	53.9	83.9	54.5	84.7	55.0	85.5	55.6	57	
3	..	80.6	53.9	81.5	54.4	82.3	55.0	83.1	55.6	84.0	56.1	84.8	56.7	..	5
	34	80.4	54.2	81.2	54.8	82.1	55.4	82.9	55.9	83.7	56.5	84.6	57.0	56	
	35	79.5	55.6	80.3	56.2	81.1	56.8	81.9	57.4	82.7	57.9	83.6	58.5	55	
	36	78.5	57.0	79.3	57.6	80.1	58.2	80.9	58.8	81.7	59.4	82.5	60.0	54	
$3\frac{1}{4}$	..	77.9	57.8	78.7	58.4	79.5	59.0	80.3	59.6	81.1	60.2	81.9	60.8	..	$4\frac{3}{4}$
	37	77.5	58.4	78.3	59.0	79.1	59.6	79.9	60.2	80.7	60.8	81.5	61.4	53	
	38	76.4	59.7	77.2	60.3	78.0	61.0	78.8	61.6	79.6	62.2	80.4	62.8	52	
	39	75.4	61.0	76.2	61.7	76.9	62.3	77.7	62.9	78.5	63.6	79.3	64.2	51	
$3\frac{1}{2}$	..	75.0	61.5	75.7	62.2	76.5	62.8	77.3	63.4	78.1	64.1	78.8	64.7	..	$4\frac{1}{2}$
	40	74.3	62.4	75.1	63.0	75.8	63.6	76.6	64.3	77.4	64.9	78.1	65.6	50	
	41	73.2	63.6	74.0	64.3	74.7	64.9	75.5	65.6	76.2	66.3	77.0	66.9	49	
	42	72.1	64.9	72.8	65.6	73.6	66.2	74.3	66.9	75.1	67.6	75.8	68.3	48	
$3\frac{3}{4}$	..	71.9	65.1	72.6	65.8	73.3	66.5	74.1	67.2	74 8	67.8	75.6	68.5	..	$4\frac{1}{4}$
	43	70.9	66.2	71.7	66.8	72.4	67.5	73.1	68.2	73.9	68.9	74.6	69.6	47	
	44	69.8	67.4	70.5	68.1	71.2	68.8	71.9	69.5	72.7	70.2	73.4	70.9	46	
4	45	68.6	68.6	69.3	69.3	70.0	70.0	70.7	70.7	71.4	71.4	72.1	72.1	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		97		98		99		100		101		102			Rumos

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Rumos Pt.	Gr.	Distancia 103 Lt.	103 Ap.	104 Lt.	104 Ap.	105 Lt.	105 Ap.	106 Lt.	106 Ap.	107 Lt.	107 Ap.	108 Lt.	108 Ap.	Rumos Gr.	Pt.
	1	103.0	1.8	104.0	1.8	105.0	1.8	106.0	1.8	107.0	1.9	108.0	1.9	89	
	2	102.9	3.6	103.9	3.6	104.9	3.7	105.9	3.7	106.9	3.7	107.9	3.8	88	
1/4	..	102.9	5.1	103.9	5.1	104.9	5.4	105.9	5.2	106.9	5.3	107.9	5.3	..	7 3/4
	3	102.9	5.4	103.9	5.4	104.9	5.5	105.9	5.5	106.9	5.6	107.9	5.7	87	
	4	102.7	7.2	103.7	7.3	104.7	7.3	105.7	7.4	106.7	7.5	107.7	7.5	86	
	5	102.6	9.0	103.6	9.1	104.6	9.2	105.6	9.2	106.6	9.3	107.6	9.4	85	
1/2	..	102.5	10.1	103.5	10.2	104.5	10.3	105.5	10.4	106.5	10.5	107.5	10.6	..	7 1/2
	6	102.4	10.8	103.4	10.9	104.4	11.0	105.4	11.1	106.4	11.2	107.4	11.3	84	
	7	102.2	12.6	103.2	12.7	104.2	12.8	105.2	12.9	106.2	13.0	107.2	13.2	83	
	8	102.0	14.3	103.0	14.5	104.0	14.6	105.0	14.8	106.0	14.9	106.9	15.0	82	
3/4	..	101.9	15.1	102.9	15.3	103.9	15.4	104.8	15.5	105.8	15.7	106.8	15.8	..	7 1/4
	9	101.7	16.1	102.7	16.3	103.7	16.4	104.7	16.6	105.7	16.7	106.7	16.9	81	
	10	101.4	17.9	102.4	18.1	103.4	18.2	104.4	18.4	105.4	18.6	106.4	18.8	80	
	11	101.1	19.7	102.1	19.8	103.1	20.0	104.1	20.2	105.0	20.4	106.0	20.6	79	
1	..	101.0	20.1	102.0	20.3	103.0	20.5	104.0	20.7	104.9	20.9	105.9	21.1	..	7
	12	100.7	21.4	101.7	21.6	102.7	21.8	103.7	22.0	104.7	22.2	105.6	22.5	78	
	13	100.4	23.2	101.3	23.4	102.3	23.6	103.3	23.8	104.3	24.1	105.2	24.3	77	
	14	99.9	24.9	100.9	25.2	101.9	25.4	102.9	25.6	103.8	25.9	104.8	26.1	76	
1 1/4	..	99.9	25.0	100.9	25.3	101.9	25.5	102.8	25.8	103.8	26.0	104.8	26.2	..	6 3/4
	15	99.5	26.7	100.5	26.9	101.4	27.2	102.4	27.4	103.4	27.7	104.3	28.0	75	
	16	99.0	28.4	100.0	28.7	100.9	28.9	101.9	29.2	102.9	29.5	103.8	29.8	74	
1 1/2	..	98.6	29.9	99.5	30.2	100.5	30.5	101.4	30.8	102.4	31.1	103.4	31.4	..	6 1/2
	17	98.5	30.1	99.5	30.4	100.4	30.7	101.4	31.0	102.3	31.3	103.3	31.6	73	
	18	98.0	31.8	98.9	32.1	99.9	32.4	100.8	32.8	101.8	33.1	102.7	33.4	72	
	19	97.4	33.5	98.3	33.9	99.3	34.2	100.2	34.5	101.2	34.8	102.1	35.2	71	
1 3/4	..	97.0	34.7	97.9	35.0	98.9	35.4	99.8	35.7	100.7	36.0	101.7	36.4	..	6 1/4
	20	96.8	35.2	97.7	35.6	98.7	35.9	99.6	36.3	100.5	36.6	101.5	36.9	70	
	21	96.2	36.9	97.1	37.3	98.0	37.6	99.0	38.0	99.9	38.3	100.8	38.7	69	
	22	95.5	38.6	96.4	39.0	97.4	39.3	98.3	39.7	99.2	40.1	100.1	40.5	68	
2	..	95.2	39.4	96.1	39.8	97.0	40.2	97.9	40.6	98.9	41.0	99.8	41.3	..	6
	23	94.8	40.2	95.7	40.6	96.7	41.0	97.6	41.4	98.5	41.8	99.4	42.2	67	
	24	94.1	41.9	95.0	42.3	95.9	42.7	96.8	43.1	97.7	43.5	98.7	43.9	66	
	25	93.3	43.5	94.3	44.0	95.2	44.4	96.1	44.8	97.0	45.2	97.9	45.6	65	
2 1/4	..	93.1	44.0	94.0	44.5	94.9	44.9	95.8	45.3	96.7	45.8	97.6	46.2	..	5 3/4
	26	92.6	45.2	93.5	45.6	94.4	46.0	95.3	46.5	96.2	46.9	97.1	47.3	64	
	27	91.8	46.8	92.7	47.2	93.6	47.7	94.4	48.1	95.3	48.6	96.2	49.0	63	
2 1/2	28	90.9	48.4	91.8	48.8	92.7	49.3	93.6	49.8	94.5	50.2	95.4	50.7	62	
	..	90.8	48.5	91.7	49.0	92.6	49.5	93.5	50.0	94.4	50.4	95.3	50.9	..	5 1/2
	29	90.1	49.9	91.0	50.4	91.8	50.9	92.7	51.4	93.6	51.9	94.5	52.4	61	
	30	89.2	51.5	90.1	52.0	90.9	52.5	91.8	53.0	92.7	53.5	93.5	54.0	60	
2 3/4	..	88.3	52.9	89.2	53.5	90.1	54.0	90.9	54.5	91.8	55.0	92.6	55.5	..	5 1/4
	31	88.3	53.0	89.1	53.6	90.0	54.1	90.9	54.6	91.7	56.1	92.6	55.6	59	
	32	87.3	54.6	88.2	55.1	89.0	55.6	89.9	56.2	90.7	56.7	91.6	57.2	58	
	33	86.4	56.1	87.2	56.6	88.1	57.2	88.9	57.7	89.7	58.3	90.6	58.8	57	
3	..	85.6	57.2	86.5	57.8	87.3	58.3	88.1	58.9	89.0	59.4	89.8	60.0	..	5
	34	85.4	57.6	86.2	58.2	87.0	58.7	87.9	59.3	88.7	59.8	89.5	60.4	56	
	35	84.4	59.1	85.2	59.7	86.0	60.2	86.8	60.8	87.6	61.4	88.5	61.9	55	
	36	83.3	60.5	84.1	61.1	84.9	61.7	85.8	62.3	86.6	62.9	87.4	63.5	54	
3 1/4	..	82.7	61.4	83.5	62.0	84.3	02.6	85.1	63.1	85.9	63.7	86.7	64.3	..	4 3/4
	37	82.3	62.0	83.1	62.6	83.9	63.2	84.7	63.8	85.5	64.4	86.3	65.0	53	
	38	81.2	63.4	82.0	64.0	82.7	64.6	83.5	65.3	84.3	65.9	85.1	66.5	52	
	39	80.0	64.8	80.8	65.4	81.6	66.1	82.4	66.7	83.2	67.3	83.9	68.0	51	
3 1/2	..	79.6	65.3	80.4	66.0	81.2	66.6	81.9	67.2	82.7	67.9	83.5	68.5	..	4 1/2
	40	78.9	66.2	79.7	66.8	80.4	67.5	81.2	68.1	82.0	68.8	82.7	69.4	50	
	41	77.7	67.6	78.5	68.2	79.2	68.9	80.0	69.5	80.8	70.2	81.5	70.9	49	
3 3/4	42	76.5	68.9	77.3	69.6	78.0	70.3	78.8	70.9	79.5	71.6	80.3	72.3	48	
	..	76.3	69.2	77.1	69.8	77.8	70.5	78.5	71.2	79.3	71.8	80.0	72.5	..	4 1/4
	43	75.3	70.2	76.1	70.9	76.8	71.6	77.5	72.3	78.3	73.0	79.0	73.7	47	
	44	74.1	71.5	74.8	72.2	75.5	72.9	76.3	73.6	77.0	74.3	77.7	75.0	46	
4	45	72.8	72.8	73.5	73.5	74.2	74.2	75.0	75.0	75.7	75.7	76.4	76.4	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		103		104		105		106		107		108		Rumos	

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D)

08	Distancia 109		110		111		112		113		114		Rumos	
Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
1	109.0	1.9	110.0	1.9	111.0	1.9	112.0	2.0	113.0	2.0	114.0	2.0	89	
2	108.9	3.8	109.9	3.8	110.9	3.9	111.9	3.9	112.9	3.9	113.9	4.0	88	
..	108.9	5.4	109.9	5.4	110.9	5.5	111.9	5.4	112.9	5.5	113.9	5.6	..	$7\frac{3}{4}$
3	108.9	5.7	109.8	5.8	110.8	5.8	111.8	5.9	112.8	5.9	113.8	6.0	87	
4	108.7	7.6	109.7	7.7	110.7	7.7	111.7	7.8	112.7	7.9	113.7	8.0	86	
5	108.6	9.5	109.6	9.6	110.6	9.7	111.6	9.8	112.6	9.8	113.6	9.9	85	
..	108.5	10.7	109.5	10.8	110.5	10.9	111.5	11.0	112.5	11.1	113.5	11.2	..	$7\frac{1}{2}$
6	108.4	11.4	109.4	11.5	110.4	11.6	111.4	11.7	112.4	11.8	113.4	11.9	84	
7	108.2	13.3	109.2	13.4	110.2	13.5	111.2	13.6	112.2	13.8	113.2	13.9	83	
8	107.9	15.2	108.9	15.3	109.9	15.4	110.9	15.6	111.9	15.7	112.9	15.9	82	
..	107.8	16.0	108.8	16.1	109.8	16.3	110.8	16.4	111.8	16.6	112.8	16.7	..	$7\frac{1}{4}$
9	107.7	17.1	108.6	17.2	109.6	17.4	110.6	17.5	111.6	17.7	112.6	17.8	81	
10	107.3	18.9	108.3	19.1	109.3	19.3	110.3	19.4	111.3	19.6	112.3	19.8	80	
11	107.0	20.8	108.0	21.0	109.0	21.2	109.9	21.4	110.9	21.6	111.9	21.8	79	
..	106.9	21.3	107.9	21.5	108.9	21.7	109.8	21.9	110.8	22.0	111.8	22.2	..	7
12	106.6	22.7	107.6	22.9	108.6	23.1	109.6	23.3	110.5	23.5	111.5	23.7	78	
13	106.2	24.5	107.2	24.7	108.2	25.0	109.1	25.2	110.1	25.4	111.1	25.6	77	
14	105.8	26.4	106.7	26.6	107.7	26.9	108.7	27.1	109.6	27.3	110.6	27.6	76	
..	105.7	26.5	106.7	26.7	107.7	27.0	108.6	27.2	109.6	27.5	110.6	27.7	.	$6\frac{3}{4}$
15	105.3	28.2	106.3	28.5	107.2	28.7	108.2	29.0	109.1	29.2	110.1	29.5	75	
16	104.8	30.0	105.7	30.3	106.7	30.6	107.7	30.9	108.6	31.1	109.6	31.4	74	
..	104.3	31.6	105.3	31.9	106.2	32.2	107.2	32.5	108.1	32.8	109.1	33.1	..	$6\frac{1}{2}$
17	104.2	31.9	105.2	32.2	106.1	32.5	107.1	32.7	108.1	33.0	109.0	33.3	73	
18	103.7	33.7	104.6	34.0	105.6	34.3	106.5	34.6	107.5	34.9	108.4	35.2	72	
19	103.1	35.5	104.0	35.8	105.0	36.1	105.9	36.5	106.8	36.8	107.8	37.1	71	
..	102.6	36.7	103.6	37.1	104.5	37.4	105.4	37.7	106.4	38.1	107.3	38.4	..	$6\frac{1}{4}$
20	102.4	37.3	103.4	37.6	104.3	38.0	105.2	38.3	106.2	38.6	107.1	39.0	70	
21	101.8	39.1	102.7	39.4	103.6	39.8	104.6	40.1	105.5	40.5	106.4	40.9	69	
22	101.1	40.8	102.0	41.2	102.9	41.6	103.8	42.0	104.8	42.3	105.7	42.7	68	
..	100.7	41.7	101.6	42.1	102.6	42.5	103.5	42.9	104.4	43.2	105.3	43.6	..	6
23	100.3	42.6	101.3	43.0	102.2	43.4	103.1	43.8	104.0	44.2	104.9	44.5	67	
24	99.6	44.3	100.5	44.7	101.4	45.1	102.3	45.6	103.2	46.0	104.1	46.4	66	
25	98.5	46.1	99.7	46.5	100.6	46.9	101.5	47.3	102.4	47.8	103.3	48.2	65	
..	98.5	46.6	99.4	47.0	100.3	47.5	101.2	47.9	102.1	48.3	103.1	48.7	..	$5\frac{3}{4}$
26	98.0	47.8	98.9	48.2	99.8	48.7	100.7	49.1	101.6	49.5	102.5	50.0	64	
27	97.1	49.5	98.0	49.9	98.9	50.4	99.8	50.8	100.7	51.3	101.6	51.8	63	
28	96.2	51.2	97.1	51.6	98.0	52.1	98.9	52.6	99.8	53.1	100.7	53.5	62	
..	96.1	51.4	97.0	51.8	97.9	52.3	98.8	52.8	99.7	53.3	100.5	53.7	..	$5\frac{1}{2}$
29	94.8	52.8	96.2	53.3	97.1	53.8	98.0	54.3	98.8	54.8	99.7	55.3	61	
30	94.4	54.5	95.3	55.0	96.1	55.5	97.0	56.0	97.9	56.5	98.7	57.0	60	
..	93.5	56.0	94.3	56.5	95.2	57.1	96.1	57.6	96.9	58.1	97.8	58.6	..	$5\frac{1}{4}$
31	93.4	56.1	94.3	56.7	95.1	57.2	96.0	57.7	96.9	58.2	97.7	58.7	59	
32	92.4	57.8	93.3	58.3	94.1	58.8	95.0	59.4	95.8	59.9	96.7	60.4	58	
33	91.4	59.4	92.3	59.9	93.1	60.5	93.9	61.0	94.8	61.5	95.6	62.1	57	
..	90.6	60.6	91.5	61.1	92.3	61.7	93.1	62.2	94.0	62.8	94.8	63.3	..	5
34	90.4	61.0	91.2	61.5	92.0	62.1	92.9	62.6	93.7	63.2	94.5	63.7	56	
35	89.3	62.5	90.1	63.1	90.9	63.7	91.7	64.2	92.6	64.8	93.4	65.4	55	
36	88.2	64.1	89.0	64.7	89.8	65.2	90.6	65.8	91.4	66.4	92.2	67.0	54	
..	87.5	64.9	88.4	65.5	89.2	66.1	90.0	66.7	90.8	67.3	91.6	67.9	..	$4\frac{3}{4}$
37	87.1	65.6	87.8	66.2	88.6	66.8	89.4	67.4	90.2	68.0	91.0	68.6	53	
38	85.9	67.1	86.7	67.7	87.5	68.3	88.3	69.0	89.0	69.6	89.8	70.2	52	
39	84.7	68.6	85.5	69.2	86.3	69.9	87.0	70.5	87.8	71.1	88.6	71.7	51	
..	84.3	69.1	85.0	69.8	85.8	70.4	86.6	71.0	87.3	71.7	88.1	72.3	..	$4\frac{1}{2}$
40	83.5	70.1	84.3	70.7	85.0	71.3	85.8	72.0	86.6	72.6	87.3	73.3	50	
41	82.3	71.5	83.0	72.2	83.8	72.8	84.5	73.5	85.3	74.1	86.0	74.8	49	
42	81.0	72.9	81.7	73.6	82.5	74.3	83.2	74.9	84.0	75.6	84.7	76.3	48	
..	80.8	73.2	81.5	73.9	82.2	74.5	83.0	75.2	83.7	75.9	84.5	76.5	..	$4\frac{1}{4}$
43	79.7	74.3	80.4	75.0	81.2	75.7	81.9	76.4	82.6	77.1	83.4	77.7	47	
44	78.4	75.7	79.1	76.4	79.8	77.1	80.6	77.8	81.3	78.5	82.0	79.2	46	
45	77.1	77.1	77.8	77.8	78.5	78.5	79.2	79.2	79.9	79 9	80.6	80.6	45	4
Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
08	109		110		111		112		113		114		Rumos	

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T. I)

Rumos Pt.	Gr.	Distancia 115 Lt.	115 Ap.	116 Lt.	116 Ap.	117 Lt.	117 Ap.	118 Lt.	118 Ap.	119 Lt.	119 Ap.	120 Lt.	120 Ap.	Rumos Gr.	Pt.
	1	115.0	2.0	116.0	2.0	117.0	2.0	118.0	2.1	119.0	2.1	120.0	2.1	89	
	2	114.9	4.0	115.9	4.0	116.9	4.1	117.9	4.1	118.9	4.2	119.9	4.2	88	
1/4	..	114.9	5.6	115.9	5.7	116.9	5.7	117.9	5.8	118.9	5.8	119.9	5.9	..	3/4
	3	114.8	6.0	115.8	6.1	116.8	6.1	117.8	6.2	118.8	6.2	119.8	6.3	87	
	4	114.7	8.0	115.7	8.1	116.7	8.2	117.7	8.2	118.7	8.3	119.7	8.4	86	
	5	114.6	10.0	115.6	10.1	116.6	10.2	117.6	10.3	118.5	10.4	119.5	10.5	85	
1/2	..	114.4	11.3	115.4	11.4	116.4	11.5	117.4	11.6	118.4	11.7	119.4	11.8	..	1/2
	6	114.4	12.0	115.4	12.1	116.4	12.2	117.4	12.3	118.3	12.4	119.3	12.5	84	
	7	114.1	14.0	115.1	14.1	116.1	14.3	117.1	14.4	118.1	14.5	119.1	14.6	83	
	8	113.9	16.0	114.9	16.1	115.9	16.3	116.9	16.4	117.8	16.6	118.8	16.7	82	
3/4	..	113.7	16.9	114.7	17.0	115.7	17.2	116.7	17.3	117.7	17.5	118.7	17.6	..	1/4
	9	113.6	18.0	114.6	18.1	115.6	18.3	116.5	18.5	117.5	18.6	118.5	18.8	81	
	10	113.3	20.0	114.2	20.1	115.2	20.3	116.2	20.5	117.2	20.7	118.2	20.8	80	
	11	112.9	21.9	113.9	22.1	114.9	22.3	115.8	22.5	116.8	22.7	117.8	22.9	79	
1	..	112.8	22.4	113.8	22.6	114.7	22.8	115.7	23.0	116.7	23.2	117.7	23.4	..	7
	12	112.5	23.9	113.5	24.1	114.4	24.3	115.4	24.5	116.4	24.7	117.4	24.9	78	
	13	112.1	25.9	113.0	26.1	114.0	26.3	115.0	26.5	116.0	26.8	116.9	27.0	77	
	14	111.6	27.8	112.6	28.1	113.5	28.3	114.5	28.6	115.5	28.8	116.4	29.0	76	
1/4	..	111.6	27.9	112.5	28.2	113.5	28.4	114.5	28.7	115.4	28.9	116.4	29.2	..	3/4
	15	111.1	29.8	112.0	30.0	113.0	30.3	114.0	30.5	114.9	30.8	115.9	31.1	75	
	16	110.5	31.7	111.5	32.0	112.5	32.2	113.4	32.5	114.4	32.8	115.4	33.1	74	
1/2	..	110.1	33.4	111.0	33.7	112.0	34.0	112.9	34.2	113.9	34.5	114.8	34.8	..	1/2
	17	110.0	33.6	110.9	33.9	111.9	34.2	112.8	34.5	113.8	34.8	114.8	35.1	73	
	18	109.4	35.5	110.3	35.8	111.3	36.2	112.2	36.5	113.2	36.8	114.1	37.1	72	
	19	108.7	37.4	109.7	37.8	110.6	38.1	111.6	38.4	112.5	38.7	113.5	39.1	71	
3/4	..	108.3	38.7	109.2	39.1	110.2	39.4	111.1	39.7	112.0	40.1	113.0	40.4	..	1/4
	20	108.1	39.3	109.0	39.7	109.9	40.0	110.9	40.4	111.8	40.7	112.8	41.0	70	
	21	107.4	41.2	108.3	41.6	109.2	41.9	110.2	42.3	111.1	42.6	112.0	43.0	69	
	22	106.6	43.1	107.6	43.5	108.5	43.8	109.4	44.2	110.3	44.6	111.3	45.0	68	
2	..	106.3	44.0	107.2	44.4	108.1	44.8	109.0	45.2	109.9	45.5	110.9	45.9	..	6
	23	105.9	44.9	106.8	45.3	107.7	45.7	108.6	46.1	109.5	46.5	110.5	46.9	67	
	24	105.1	46.8	106.0	47.2	106.9	47.6	107.8	48.0	108.7	48.4	109.6	48.8	66	
	25	104.2	48.6	105.1	49.0	106.0	49.4	106.9	49.9	107.9	50.3	108.8	50.7	65	
2 1/4	..	104.0	49.2	104.9	49.6	105.8	50.0	106.7	50.5	107.6	50.9	108.5	51.3	..	3/4
	26	103.4	50.4	104.3	50.9	105.2	51.3	106.1	51.7	107.0	52.2	107.9	52.6	64	
	27	102.5	52.2	103.4	52.7	104.2	53.1	105.1	53.6	106.0	54.0	106.9	54.5	63	
	28	101.5	54.0	102.4	54.5	103.3	54.9	104.2	55.4	105.1	55.9	106.0	56.3	62	
2 1/2	..	101.4	54.2	102.3	54.7	103.2	55.1	104.1	55.6	105.0	56.1	105.8	56.6	..	1/2
	29	100.6	55.8	101.5	56.2	102.3	56.7	103.2	57.2	104.1	57.7	105.0	58.2	61	
	30	99.6	57.5	100.5	58.0	101.3	58.5	102.2	59.0	103.1	59.5	103.9	60.0	60	
2 3/4	..	98.6	59.1	99.5	59.6	100.4	60.1	101.2	60.7	102.1	61.2	102.9	61.7	..	1/4
	31	98.6	59.2	99.4	59.7	100.3	60.3	101.1	60.8	102.0	61.3	102.9	61.8	59	
	32	97.5	60.9	98.4	61.5	99.2	62.0	100.1	62.5	100.9	63.1	101.8	63.6	58	
	33	96.4	62.6	97.3	63.2	98.1	63.7	99.0	64.3	99.8	64.8	100.6	65.4	57	
3	..	95.6	63.9	96.4	64.4	97.3	65.0	98.1	65.6	98.9	66.1	99.8	66.7	..	5
	34	95.3	64.3	96.2	64.9	97.0	65.4	97.8	66.0	98.7	66.5	99.5	67.1	56	
	35	94.2	66.0	95.0	66.5	95.8	67.1	96.7	67.7	97.5	68.3	98.3	68.8	55	
	36	93.0	67.6	93.8	68.2	94.7	68.8	95.5	69.4	96.3	69.9	97.1	70.5	54	
3 1/4	..	92.4	68.5	93.2	69.1	94.0	69.7	94.8	70.3	95.6	70.9	96.4	71.5	..	3/4
	37	91.8	69.2	92.6	69.8	93.4	70.4	94.2	71.0	95.0	71.6	95.8	72.2	55	
	38	90.6	70.8	91.4	71.4	92.2	72.0	93.0	72.6	93.8	73.3	94.6	73.9	52	
	39	89.4	72.4	90.1	73.0	90.9	73.6	91.7	74.3	92.5	74.9	93.3	75.5	51	
3 1/2	..	88.9	73.0	89.7	73.6	90.4	74.2	91.2	74.9	92.0	75.5	92.8	76.1	..	1/2
	40	88.1	73.9	88.9	74.6	89.6	75.2	90.4	75.8	91.2	76.5	91.9	77.1	50	
	41	86.8	75.4	87.5	76.1	88.3	76.8	89.1	77.4	89.8	78.1	90.6	78.7	49	
	42	85.5	77.0	86.2	77.6	86.9	78.3	87.7	79.0	88.4	79.6	89.2	80.3	48	
3 3/4	..	85.2	77.2	85.9	77.9	86.7	78.6	87.4	79.2	88.2	79.9	88.9	80.6	..	1/4
	43	84.1	78.4	84.8	79.1	85.6	79.8	86.3	80.5	87.0	81.2	87.8	81.8	47	
	44	82.7	79.9	83.4	80.6	84.2	81.3	84.9	82.0	85.6	82.7	86.3	83.4	46	
4	45	81.3	81.3	82.0	82.0	82.7	82.7	83.4	83.4	84.1	84.1	84.8	84.8	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		115		116		117		118		119		120			Rumos

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Rumos Pt.	Rumos Gr.	Distancia 121 Lt.	121 Ap.	122 Lt.	122 Ap.	123 Lt.	123 Ap.	124 Lt.	124 Ap.	125 Lt.	125 Ap.	126 Lt.	126 Ap.	Rumos Gr.	Rumos Pt.
	1	121.0	2.1	122.0	2.1	123.0	2.1	124.0	2.2	125.0	2.2	126.0	2.2	89	
$\frac{1}{4}$	2	120.9	4.2	121.9	4.3	122.9	4.3	123.9	4.3	124.9	4.4	125.9	4.4	88	
	..	120.9	5.9	121.9	6.0	122.9	6.0	123.9	6.1	124.9	6.1	125.8	6.2	..	$7\frac{3}{4}$
	3	120.8	6.3	121.8	6.4	122.8	6.4	123.8	6.5	124.8	6.5	125.8	6.6	87	
	4	120.7	8.4	121.7	8.5	122.7	8.6	123.7	8.6	124.7	8.7	125.7	8.8	86	
	5	120.5	10.5	121.5	10.6	122.5	10.7	123.5	10.8	124.5	10.9	125.5	11.0	85	
$\frac{1}{2}$	..	120.4	11.9	121.4	12.0	122.4	12.1	123.4	12.2	124.4	12.3	125.4	12.3	..	$7\frac{1}{2}$
	6	120.3	12.6	121.3	12.8	122.3	12.9	123.3	13.0	124.3	13.1	125.3	13.2	84	
	7	120.1	14.7	121.1	14.9	122.1	15.0	123.1	15.1	124.1	15.2	125.1	15.4	83	
	8	119.8	16.8	120.8	17.0	121.8	17.1	122.8	17.3	123.8	17.4	124.8	17.5	82	
$\frac{3}{4}$	..	119.7	17.7	120.7	17.9	121.7	18.0	122.7	18.2	123.6	18.3	124.6	18.5	..	$7\frac{1}{4}$
	9	119.5	18.9	120.5	19.1	121.5	19.2	122.5	19.4	123.5	19.6	124.4	19.7	81	
	10	119.2	21.0	120.1	21.2	121.1	21.4	122.1	21.5	123.1	21.7	124.1	21.9	80	
	11	118.8	23.1	119.8	23.3	120.7	23.5	121.7	23.7	122.7	23.9	123.7	24.0	79	
1	..	118.7	23.6	119.7	23.8	120.6	24.0	121.6	24.2	122.6	24.4	123.6	24.6	..	7
	12	118.4	25.2	119.3	25.4	120.3	25.6	121.3	25.8	122.3	26.0	123.2	26.2	78	
	13	117.9	27.2	118.9	27.4	119.8	27.7	120.8	27.9	121.8	28.1	122.8	28.3	77	
	14	117.4	29.3	118.4	29.5	119.3	29.8	120.3	30.0	121.3	30.2	122.3	30.5	76	
$1\frac{1}{4}$	..	117.4	29.4	118.3	29.6	119.3	29.9	120.3	30.1	121.3	30.4	122.2	30.6	..	$6\frac{3}{4}$
	15	116.9	31.3	117.8	31.6	118.8	31.8	119.8	32.1	120.7	32.4	121.7	32.6	75	
	16	116.3	33.4	117.3	33.6	118.2	33.9	119.2	34.2	120.2	34.5	121.1	34.7	74	
$1\frac{1}{2}$	..	115.8	35.1	116.8	35.4	117.7	35.7	118.7	36.0	119.6	36.3	120.6	36.6	..	$6\frac{1}{2}$
	17	115.7	35.4	116.7	35.7	117.6	36.0	118.6	36.3	119.5	36.5	120.5	36.8	73	
	18	115.1	37.4	116.0	37.7	117.0	38.0	117.9	38.3	118.9	38.6	119.8	38.9	72	
	19	114.4	39.4	115.4	39.7	116.3	40.0	117.2	40.4	118.2	40.7	119.1	41.0	71	
$1\frac{3}{4}$	..	113.9	40.8	114.9	41.1	115.8	41.4	116.7	41.8	117.7	42.1	118.6	42.4	..	$6\frac{1}{4}$
	20	113.7	41.4	114.6	41.7	115.6	42.1	116.5	42.4	117.5	42.8	118.4	43.1	70	
	21	113.0	43.4	113.9	43.7	114.8	44.1	115.8	44.4	116.7	44.8	117.0	45.2	69	
	22	112.2	45.3	113.1	45.7	114.0	46.1	115.0	46.5	115.9	46.8	116.8	47.2	68	
2	..	111.8	46.3	112.7	46.7	113.6	47.1	114.6	47.5	115.5	47.8	116.4	48.2	..	6
	23	111.4	47.3	112.3	47.7	113.2	48.1	114.1	48.5	115.1	48.8	116.0	49.2	67	
	24	110.5	49.2	111.5	49.6	112.4	50.0	113.3	50.4	114.2	50.8	115.1	51.2	66	
	25	109.7	51.1	110.6	51.6	111.5	52.0	112.4	52.4	113.3	52.8	114.2	53.2	65	
$2\frac{1}{4}$	..	109.4	51.7	110.3	52.2	111.2	52.6	112.1	53.0	113.0	53.5	113.9	53.9	..	$5\frac{3}{4}$
	26	108.8	53.0	109.7	53.5	110.6	53.9	111.5	54.4	112.3	54.8	113.2	55.2	64	
	27	107.8	54.9	108.7	55.4	109.6	55.8	110.5	56.3	111.4	56.7	112.3	57.2	63	
	28	106.8	56.8	107.7	57.3	108.6	57.7	109.5	58.2	110.4	58.7	111.3	59.2	62	
$2\frac{1}{2}$	..	106.7	57.0	107.6	57.5	108.5	58.0	109.4	58.4	110.2	58.9	111.1	59.4	..	$5\frac{1}{2}$
	29	105.8	58.7	106.7	59.1	107.6	59.6	108.5	60.1	109.3	60.6	110.2	61.1	61	
	30	104.8	60.5	105.7	61.0	106.5	61.5	107.4	62.0	108.3	62.5	109.1	63.0	60	
$2\frac{3}{4}$	..	103.8	62.2	104.6	62.7	105.5	63.2	106.4	63.7	107.2	64.3	108.1	64.8	..	$5\frac{1}{4}$
	31	103.7	62.3	104.6	62.8	105.4	63.3	106.3	63.9	107.1	64.4	108.0	64.9	59	
	32	102.6	64.1	103.5	64.7	104.3	65.2	105.2	65.7	106.0	66.2	106.9	66.8	58	
	33	101.5	65.9	102.3	66.4	103.2	67.0	104.0	67.5	104.8	68.1	105.7	68.6	57	
3	..	100.6	67.2	101.4	67.8	102.3	68.3	163.1	68.9	103.9	69.4	104.8	70.0	..	5
	34	100.3	67.7	101.1	68.2	102.0	68.8	102.8	69.3	103.6	69.9	104.5	70.5	56	
	35	99.1	69.4	99.9	70.0	100.8	70.5	101.6	71.1	102.4	71.7	103.2	72.3	55	
	36	97.9	71.1	98.7	71.7	99.5	72.3	100.3	72.9	101.1	73.5	101.9	74.1	54	
$3\frac{1}{4}$	..	97.2	72.1	98.0	72.7	98.8	73.3	99.6	73.9	100.4	74.5	101.2	75.1	..	$4\frac{3}{4}$
	37	96.6	72.8	97.4	73.4	98.2	74.0	99.0	74.6	99.8	75.2	100.6	75.8	53	
	38	95.3	74.5	96.1	75.1	96.9	75.7	97.7	76.3	98.5	77.0	99.3	77.6	52	
	39	94.0	76.1	94.8	76.8	95.6	77.4	96.4	78.0	97.1	78.7	97.9	79.3	51	
$3\frac{1}{2}$	..	93.5	76.8	94.3	77.4	95.1	78.0	95.8	78.7	96.6	79.3	97.4	79.9	..	$4\frac{1}{2}$
	40	92.7	77.8	93.5	78.4	94.2	79.1	95.0	79.7	95.8	80.3	96.5	81.0	50	
	41	91.3	79.4	92.1	80.0	92.8	80.7	93.6	81.4	94.3	82.0	95.1	82.7	49	
	42	89.9	81.0	90.7	81.6	91.4	82.3	92.1	83.0	92.9	83.6	93.6	84.3	48	
$3\frac{3}{4}$	..	89.6	81.3	90.4	81.9	91.0	82.6	91.9	83.3	92.6	83.9	93.4	84.6	.	$4\frac{1}{4}$
	43	88.5	82.5	89.2	83.2	90.0	83.9	90.7	84.6	91.4	85.2	92.2	85.9	47	
	44	87.0	84.1	87.8	84.7	88.5	85.4	89.2	86.1	89.9	86.8	90.6	87.5	46	
4	45	85.6	85.6	86.3	86.3	87.0	87.0	87.7	87.7	88.4	88.4	89.1	89.1	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		121		122		123		124		125		126		Rumos	

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Rumos Pt.	Gr.	Distancia 127 Lt.	127 Ap.	128 Lt.	128 Ap.	129 Lt.	129 Ap.	130 Lt.	130 Ap.	131 Lt.	131 Ap.	132 Lt.	132 Ap.	Rumos Gr.	Pt.
	1	127.0	2.2	128.0	2.2	129.0	2.3	130.0	2.3	131.0	2.3	132.0	2.3	89	
	2	126.9	4.4	127.9	4.5	128.9	4.5	129.9	4.5	130.9	4.6	131.9	4.6	88	
$\frac{1}{4}$	..	126.8	6.2	127.8	6.3	128.8	6.3	129.8	6.4	130.8	6.4	131.8	6.5	..	$7\frac{3}{4}$
	3	126.8	6.6	127.8	6.7	128.8	6.8	129.8	6.8	130.8	6.9	131.8	6.9	87	
	4	126.7	8.9	127.7	8.9	128.7	9.0	129.7	9.1	130.7	9.1	131.7	9.2	86	
	5	126.5	11.1	127.5	11.2	128.5	11.2	129.5	11.3	130.5	11.4	131.5	11.5	85	
$\frac{1}{2}$	..	126.4	12.4	127.4	12.5	128.4	12.6	129.4	12.7	130.4	12.8	131.4	12.9	.	$7\frac{1}{2}$
	6	126.3	13.3	127.3	13.4	128.3	13.5	129.3	13.6	130.3	13.7	131.3	13.8	84	
	7	126.1	15.5	127.0	15.6	128.0	15.7	129.0	15.8	130.0	16.0	131.0	16.1	83	
	8	125.8	17.7	126.8	17.8	127.7	18.0	128.7	18.1	129.7	18.2	130.7	18.4	82	
$\frac{3}{4}$	..	125.6	18.6	126.6	18.8	127.6	18.9	128.6	19.1	129.6	19.2	130.6	19.4	..	$7\frac{1}{4}$
	9	125.4	19.9	126.4	20.0	127.4	20.2	128.4	20.3	129.4	20.5	130.4	20.6	81	
	10	125.1	22.1	126.1	22.2	127.0	22.4	128.0	22.6	129.0	22.7	130.0	22.9	80	
	11	124.7	24.2	125.6	24.4	126.6	24.6	127.6	24.8	128.6	25.0	129.6	25.2	79	
1	..	124.6	24.8	125.5	25.0	126.5	25.2	127.5	25.4	128.5	25.6	129.5	25.8	..	7
	12	124.2	26.4	125.2	26.6	126.2	26.8	127.2	27.0	128.1	27.2	129.1	27.4	78	
	13	123.7	28.6	124.7	28.8	125.7	29.0	126.7	29.2	127.6	29.5	128.6	29.7	77	
	14	123.2	30.7	124.2	31.0	125.2	31.2	126.1	31.4	127.1	31.7	128.1	31.9	76	
$1\frac{1}{4}$	..	123.2	30.9	124.2	31.1	125.1	31.3	126.1	31.6	127.1	31.8	128.0	32.1	..	$6\frac{3}{4}$
	15	122.7	32.9	123.6	33.1	124.6	33.4	125.6	33.6	126.5	33.9	127.5	34.2	75	
	16	122.1	35.0	123.0	35.3	124.0	35.6	125.0	35.8	125.9	36.1	126.9	36.4	74	
$1\frac{1}{2}$	..	121.5	36.9	122.5	37.2	123.5	37.4	124.4	37.7	125.4	38.0	126.3	38.3	..	$6\frac{1}{2}$
	17	121.5	37.1	122.4	37.4	123.4	37.7	124.3	38.0	125.3	38.3	126.2	38.6	73	
	18	120.8	39.2	121.7	39.6	122.7	39.9	123.6	40.2	124.6	40.5	125.5	40.8	72	
	19	120.1	41.3	121.0	41.7	122.0	42.0	122.9	42.3	123.9	42.6	124.8	43.0	71	
$1\frac{3}{4}$	..	119.6	42.8	120.5	43.1	121.5	43.5	122.4	43.8	123.3	44.1	124.3	44.5	..	$6\frac{1}{4}$
	20	119.3	43.4	120.3	43.8	121.2	44.1	122.2	44.5	123.1	44.8	124.0	45.1	70	
	21	118.6	45.5	119.5	45.9	120.4	46.2	121.4	46.6	122.3	46.9	123.2	47.3	69	
	22	117.8	47.6	118.7	47.9	119.6	48.3	120.5	48.7	121.5	49.1	122.4	49.4	68	
2	..	117.3	48.6	118.3	49.0	119.2	49.4	120.1	49.8	121.0	50.1	122.0	50.5	..	6
	23	116.9	49.6	117.8	50.0	118.7	50.4	119.7	50.8	120.6	51.2	121.5	51.6	67	
	24	116.0	51.7	116.9	52.1	117.8	52.5	118.8	52.9	119.7	53.3	120.6	53.7	66	
	25	115.1	53.7	116.0	54.1	116.9	54.5	117.8	54.9	118.7	55.4	119.6	55.8	65	
$2\frac{1}{4}$	..	114.8	54.3	115.7	54.7	116.6	55.2	117.5	55.6	118.4	56.0	119.3	56.4	..	$5\frac{3}{4}$
	26	114.1	55.7	115.0	56.1	115.9	56.5	116.8	57.0	117.7	57.4	118.6	57.9	64	
	27	113.2	57.7	114.0	58.1	114.9	58.6	115.8	59.0	116.7	59.5	117.6	59.9	63	
	28	112.1	59.6	113.0	60.1	113.9	60.6	114.8	61.0	115.7	61.5	116.5	62.0	62	
$2\frac{1}{2}$	..	112.0	59.9	112.9	60.3	113.8	60.8	114.7	61.3	115.5	61.7	116.4	62.2	..	$5\frac{1}{2}$
	29	111.1	61.6	112.0	62.1	112.8	62.5	113.7	63.0	114.6	63.5	115.4	64.0	61	
	30	110.0	63.5	110.9	64.0	111.7	64.5	112.6	65.0	113.4	65.5	114.3	66.0	60	
$2\frac{3}{4}$	..	108.9	65.3	109.8	65.8	110.6	66.3	111.5	66.8	112.4	67.3	113.2	67.9	..	$5\frac{1}{4}$
	31	108.9	65.4	109.7	65.9	110.6	66.4	111.4	67.0	112.3	67.5	113.1	68.0	59	
	32	107.7	67.3	108.6	67.8	109.4	68.4	110.2	68.9	111.1	69.4	111.9	69.9	58	
	33	106.5	69.2	107.3	69.7	108.2	70.3	109.0	70.8	109.9	71.3	110.7	71.9	57	
3	..	105.6	70.6	106.4	71.1	107.3	71.7	108.1	72.2	108.9	72.8	109.7	73.3	..	5
	34	105.3	71.0	106.1	71.6	106.9	72.1	107.8	72.7	108.6	73.3	109.4	73.8	56	
	35	104.0	72.8	104.9	73.4	105.7	74.0	106.5	74.6	107.3	75.1	108.1	75.7	55	
	36	102.7	74.6	103.6	75.2	104.4	75.8	105.2	76.4	106.0	77.0	106.8	77.6	54	
$3\frac{1}{4}$	..	102.0	75.7	102.8	76.3	103.6	76.9	104.4	77.4	105.2	78.0	106.0	78.6	..	$4\frac{3}{4}$
	37	101.4	76.4	102.2	77.0	103.0	77.6	103.8	78.2	104.6	78.8	105.4	79.4	53	
	38	100.1	78.2	100.9	78.8	101.7	79.4	102.4	80.0	103.2	80.7	104.0	81.3	52	
	39	98.7	79.9	99.5	80.6	100.3	81.2	101.0	81.8	101.8	82.4	102.6	83.1	51	
$3\frac{1}{2}$	..	98.2	80.6	98.9	81.2	99.7	81.8	100.5	82.5	101.3	83.1	102.0	83.7	..	$4\frac{1}{2}$
	40	97.3	81.6	98.1	82.3	98.8	82.9	99.6	83.6	100.4	84.2	101.1	84.8	50	
	41	95.8	83.3	96.6	84.0	97.4	84.6	98.1	85.3	98.9	85.9	99.6	86.6	49	
	42	94.4	85.0	95.1	85.6	95.9	86.3	96.6	87.0	97.4	87.7	98.1	88.3	48	
$3\frac{3}{4}$	..	94.1	85.3	94.8	86.0	95.6	86.6	96.3	87.3	97.1	88.0	97.8	88.6	..	$4\frac{1}{4}$
	43	92.9	86.6	93.6	87.3	94.3	88.0	95.1	88.7	95.8	89.3	96.5	90.0	47	
	44	91.4	88.2	92.1	88.9	92.8	89.6	93.5	90.3	94.2	91.0	95.0	91.7	46	
4	45	89.8	89.8	90.5	90.5	91.2	91.2	91.9	91.9	92.6	92.6	93.3	93.3	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		127		128		129		130		131		132		Rumos	

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Rumos Pt.	Gr.	Distancia 133 Lt.	133 Ap.	134 Lt.	134 Ap.	135 Lt.	135 Ap.	136 Lt.	136 Ap.	137 Lt.	137 Ap.	138 Lt.	138 Ap.	Gr.	Rumos Pt.
	1	133.0	2.3	134.0	2.3	135.0	2.4	136.0	2.4	137.0	2.4	138.0	2.4	89	
1/4	2	132.9	4.6	133.9	4.7	134.9	4.7	135.9	4.7	136.9	4.8	137.9	4.8	88	
	..	132.8	6.5	133.8	6.6	134.8	6.6	135.8	6.7	136.8	6.7	137.8	6.8	..	7 3/4
	3	132.8	7.0	133.8	7.0	134.8	7.1	135.8	7.1	136.8	7.2	137.8	7.2	87	
	4	132.7	9.3	133.7	9.3	134.7	9.4	135.7	9.5	136.7	9.6	137.7	9.6	86	
	5	132.5	11.6	133.5	11.7	134.5	11.8	135.5	11.9	136.5	11.9	137.5	12.0	85	
1/2	..	132.4	13.0	133.4	13.1	134.3	13.2	135.3	13.3	136.3	13.4	137.3	13.5	..	7 1/2
	6	132.3	13.9	133.3	14.0	134.3	14.1	135.3	14.2	136.2	14.3	137.2	14.4	84	
	7	132.0	16.2	133.0	16.3	134.0	16.5	135.0	16.6	136.0	16.7	137.0	16.8	83	
	8	131.7	18.5	132.7	18.6	133.7	18.8	134.7	18.9	135.7	19.1	136.7	19.2	82	
3/4	..	131.6	19.5	132.5	19.7	133.5	19.8	134.5	20.0	135.5	20.1	136.5	20.2	..	7 1/4
	9	131.4	20.8	132.4	21.0	133.3	21.1	134.3	21.3	135.3	21.4	136.3	21.6	81	
	10	131.0	23.1	132.0	23.3	132.9	23.4	133.9	23.6	134.9	23.8	135.9	24.0	80	
	11	130.6	25.4	131.5	25.6	132.5	25.8	133.5	26.0	134.5	26.1	135.5	26.3	79	
1	..	130.4	26.0	131.4	26.1	132.4	26.3	133.4	26.5	134.4	26.7	135.3	26.9	..	7
	12	130.1	27.7	131.1	27.9	132.0	28.1	133.0	28.3	134.0	28.5	135.0	28.7	78	
	13	129.6	29.9	130.6	30.1	131.5	30.4	132.5	30.6	133.5	30.8	134.5	31.0	77	
1/4	14	129.0	32.2	130.0	32.4	131.0	32.7	132.0	32.9	132.9	33.1	133.9	33.4	76	
	..	129.0	32.3	130.0	32.6	131.0	32.8	131.9	33.0	132.9	33.3	133.9	33.5	..	6 3/4
	15	128.5	34.4	129.4	34.7	130.4	34.9	131.4	35.2	132.3	35.1	133.3	35.7	75	
	16	127.8	36.7	128.8	36.9	129.8	37.2	130.7	37.5	131.7	37.8	132.7	38.0	74	
1/2	..	127.3	38.6	128.2	38.9	129.2	39.2	130.1	39.5	131.1	39.8	132.1	40.1	..	6 1/2
	17	127.2	38.9	128.1	39.2	129.1	39.5	130.1	39.8	131.0	40.1	132.0	40.3	73	
	18	126.5	41.1	127.4	41.4	128.4	41.7	129.3	42.0	130.3	42.3	131.2	42.6	72	
	19	125.8	43.3	126.7	43.6	127.6	44.0	128.6	44.3	129.5	44.6	130.5	44.9	71	
3/4	..	125.2	44.8	126.2	45.1	127.1	45.5	128.0	45.8	129.0	46.1	129.9	46.5	..	6 1/4
	20	125.0	45.5	125.9	45.8	126.9	46.2	127.8	46.5	128.7	46.9	129.7	47.2	70	
	21	124.2	47.7	125.1	48.0	126.0	48.4	127.0	48.7	127.9	49.1	128.8	49.5	69	
	22	123.3	49.8	124.2	50.2	125.2	50.6	126.1	50.9	127.0	51.3	128.0	51.7	68	
2	..	122.9	50.9	123.8	51.3	124.7	51.7	125.7	52.0	126.6	52.4	127.5	52.8	..	6
	23	122.4	52.0	123.3	52.4	124.3	52.7	125.2	53.1	126.1	53.5	127.0	53.9	67	
	24	121.5	54.1	122.4	54.5	123.3	54.9	124.2	55.3	125.2	55.7	126.1	56.1	66	
	25	120.5	56.2	121.4	56.6	122.4	57.1	123.3	57.5	124.2	57.9	125.1	58.3	65	
2 1/4	..	120.2	56.9	121.1	57.3	122.0	57.7	122.9	58.2	123.8	58.6	124.7	59.0	..	5 3/4
	26	119.5	58.3	120.4	58.7	121.3	59.2	122.2	59.6	123.1	60.1	124.0	60.5	64	
	27	118.5	60.4	119.4	60.8	120.3	61.3	121.2	61.7	122.1	62.2	123.0	62.7	63	
2 1/2	28	117.4	62.4	118.3	62.9	119.2	63.4	120.1	63.8	121.0	64.3	121.8	64.8	62	
	..	117.3	62.7	118.2	63.2	119.1	63.6	119.9	64.1	120.8	64.6	121.7	65.0	..	5 1/2
	29	116.3	64.5	117.2	65.0	118.1	65.4	118.9	65.9	119.8	66.4	120.7	66.9	61	
	30	115.2	66.5	116.0	67.0	116.9	67.5	117.8	68.0	118.6	68.5	119.5	69.0	60	
2 3/4	..	114.1	68.4	114.9	68.9	115.8	69.4	116.6	69.9	117.5	70.4	118.4	70.9	..	5 1/4
	31	114.0	68.5	114.9	69.0	115.7	69.5	116.6	70.0	117.4	70.6	118.3	71.1	59	
	32	112.8	70.5	113.6	71.0	114.5	71.5	115.3	72.1	116.2	72.6	117.0	73.1	58	
	33	111.5	72.4	112.4	73.0	113.2	73.5	114.1	74.1	114.9	74.6	115.7	75.2	57	
3	..	110.6	73.9	111.4	74.4	112.2	75.0	113.1	75.6	113.9	76.1	114.7	76.7	..	5
	34	110.3	74.4	111.1	74.9	111.9	75.5	112.7	76.1	113.6	76.6	114.4	77.2	56	
	35	108.9	76.3	109.8	76.9	110.6	77.4	111.4	78.0	112.2	78.6	113.0	79.2	55	
	36	107.6	78.2	108.4	78.8	109.2	79.4	110.0	79.9	110.8	80.5	111.6	81.1	54	
3 1/4	..	106.8	79.2	107.6	79.8	108.4	80.4	109.2	81.0	110.0	81.6	110.8	82.2	..	4 3/4
	37	106.2	80.0	107.0	80.6	107.8	81.2	108.6	81.8	109.4	82.4	110.2	83.1	53	
	38	104.8	81.9	105.6	82.5	106.4	83.1	107.2	83.7	108.0	84.3	108.7	85.0	52	
	39	103.4	83.7	104.1	84.3	104.9	85.0	105.7	85.6	106.5	86.2	107.2	86.8	51	
3 1/2	..	102.8	84.4	103.6	85.0	104.4	85.6	105.1	86.3	105.9	86.9	106.7	87.5	..	4 1/2
	40	101.9	85.5	102.6	86.1	103.4	86.8	104.2	87.4	104.9	88.1	105.7	88.7	50	
	41	100.4	87.3	101.1	87.9	101.9	88.6	102.6	89.2	103.4	89.9	104.1	90.5	49	
	42	98.8	89.0	99.6	89.7	100.3	90.3	101.1	91.0	101.8	91.7	102.6	92.3	48	
3 3/4	..	98.5	89.3	99.3	90.0	100.0	90.7	100.8	91.3	101.5	92.0	102.2	92.7	..	4 1/4
	43	97.3	90.7	98.0	91.4	98.7	92.1	99.5	92.8	100.2	93.4	100.9	94.1	47	
	44	95.7	92.4	96.4	93.1	97.1	93.8	97.8	94.5	98.5	95.2	99.3	95.9	46	
4	45	94.0	94.0	94.8	94.8	95.5	95.5	96.2	96.2	96.9	96.9	97.6	97.6	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		133		134		135		136		137		138			Rumos

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Rumos		Distancia												Rumos	
		139		140		141		142		143		144			
Pt.	Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
	1	139.0	2.4	140.0	2.4	141.0	2.5	142.0	2.5	143.0	2.5	144.0	2.5	89	
1/4	2	138.9	4.9	139.9	4.9	140.9	4.9	141.9	5.0	142.9	5.0	143.9	5.0	88	
	..	138.8	6.8	139.8	6.9	140.8	6.9	141.8	7.0	142.8	7.0	143.8	7.1	..	7 3/4
	3	138.8	7.3	139.8	7.3	140.8	7.4	141.8	7.4	142.8	7.5	143.8	7.5	87	
	4	138.7	9.7	139.7	9.8	140.7	9.8	141.7	9.9	142.7	10.0	143.6	10.0	86	
	5	138.5	12.1	139.5	12.2	140.5	12.3	141.5	12.4	142.5	12.5	143.5	12.6	85	
1/2	..	138.3	13.6	139.3	13.7	140.3	13.8	141.3	13.9	142.3	14.0	143.3	14.1	..	7 1/2
	6	138.2	14.5	139.2	14.6	142.2	14.7	141.2	14.8	142.2	14.9	143.2	15.1	84	
	7	138.0	16.9	139.0	17.1	139.9	17.2	140.9	17.3	141.9	17.4	142.9	17.5	83	
	8	137.7	19.3	138.6	19.5	139.6	19.6	140.6	19.8	141.6	19.9	142.6	20.0	82	
3/4	..	137.5	20.4	138.5	20.5	139.5	20.7	140.5	20.8	141.4	21.0	142.4	21.1	..	7 1/4
	9	137.3	21.7	138.3	21.9	139.3	22.1	140.3	22.2	141.2	22.4	142.2	22.5	81	
	10	136.9	24.1	137.9	24.3	138.9	24.5	139.8	24.7	140.8	24.8	141.8	25.0	80	
	11	136.4	26.5	137.4	26.7	138.4	26.9	139.4	27.1	140.4	27.3	141.4	27.5	79	
1	..	136.3	27.1	137.3	27.3	138.3	27.5	139.3	27.7	140.2	27.9	141.2	28.1	..	7
	12	136.0	28.9	136.9	29.1	137.9	29.3	138.9	29.5	139.9	29.7	140.9	29.9	78	
	13	135.4	31.3	136.4	31.5	137.4	31.7	138.4	31.9	139.3	32.2	140.3	32.4	77	
1/4	14	134.9	33.6	135.8	33.9	136.8	34.1	137.8	34.4	138.8	34.6	139.7	34.8	76	
	..	134.8	33.8	135.8	34.0	136.8	34.3	137.7	34.5	138.7	34.7	139.7	35.0	..	6 3/4
	15	134.3	36.0	135.2	36.2	136.2	36.5	137.2	36.8	138.1	37.0	139.1	37.3	75	
	16	133.6	38.3	134.6	38.6	135.5	38.9	136.5	39.1	137.5	39.4	138.4	39.7	74	
1/2	..	133.0	40.3	134.0	40.6	134.9	40.9	135.9	41.2	136.8	41.5	137.8	41.8	..	6 1/2
	17	132.9	40.6	133.9	40.9	134.8	41.2	135.8	41.5	136.8	41.8	137.7	42.1	73	
	18	132.2	43.0	133.1	43.3	134.1	43.6	135.1	43.9	136.0	44.2	137.0	44.5	72	
	19	131.4	45.3	132.4	45.6	133.3	45.9	134.3	46.2	135.2	46.6	136.2	46.9	71	
3/4	..	130.9	46.8	131.8	47.2	132.8	47.5	133.7	47.8	134.6	48.2	135.6	48.5	..	6 1/4
	20	130.6	47.5	131.6	47.9	132.5	48.2	133.4	48.6	134.4	48.9	135.3	49.3	70	
	21	129.8	49.8	130.7	50.2	131.5	50.5	132.6	50.9	133.5	51.2	134.4	51.6	69	
	22	128.9	52.1	129.8	52.4	130.7	52.8	131.7	53.2	132.6	53.6	133.5	53.9	68	
2	..	128.4	53.2	129.3	53.6	130.3	54.0	131.2	54.3	132.1	54.7	133.0	55.1	..	6
	23	128.0	54.3	128.9	54.7	129.8	55.1	130.7	55.5	131.6	55.9	132.6	56.3	67	
	24	127.0	56.5	127.9	56.9	128.8	57.3	129.7	57.8	130.6	58.2	131.6	58.6	66	
	25	126.0	58.7	126.9	59.2	127.8	59.6	128.7	60.0	129.6	60.4	130.5	60.9	65	
2 1/4	..	125.7	59.4	126.6	59.9	127.5	60.3	128.4	60.7	129.3	61.2	130.2	61.6	..	5 3/4
	26	124.9	60.9	125.8	61.4	126.7	61.8	127.6	62.2	128.5	62.7	129.4	63.1	64	
	27	123.8	63.1	124.7	63.6	125.6	64.0	126.5	64.5	127.4	64.9	128.3	65.4	63	
	28	122.7	65.3	123.6	65.7	124.5	66.2	125.4	66.7	126.3	67.1	127.1	67.6	62	
2 1/2	..	122.6	65.5	123.5	66.0	124.4	66.5	125.2	66.9	126.1	67.4	127.0	67.9	..	5 1/2
	29	121.6	67.4	122.4	67.9	123.3	68.4	124.2	68.8	125.1	69.3	125.9	69.8	61	
	30	120.4	69.5	121.2	70.0	122.1	70.5	123.0	71.0	123.8	71.5	124.7	72.0	60	
2 3/4	..	119.2	71.5	120.1	72.0	120.9	72.5	121.8	73.0	122.7	73.5	123.5	74.0	..	5 1/4
	31	119.1	71.6	120.0	72.1	120.9	72.6	121.7	73.1	122.6	73.7	123.4	74.2	59	
	32	117.9	73.7	118.7	74.2	119.6	74.7	120.4	75.2	121.3	75.8	122.1	76.3	58	
	33	116.6	75.7	117.4	76.2	118.3	76.8	119.1	77.3	119.9	77.9	120.8	78.4	57	
3	..	115.6	77.2	116.4	77.8	117.2	78.3	118.1	78.9	118.9	79.4	119.7	80.0	..	5
	34	115.2	77.7	116.1	78.3	116.9	78.8	117.7	79.4	118.6	80.0	119.4	80.5	56	
	35	113.9	79.7	114.7	80.3	115.5	80.9	116.3	81.4	117.1	82.0	118.0	82.6	55	
	36	112.5	81.7	113.3	82.3	114.1	82.9	114.9	83.5	115.7	84.1	116.5	84.6	54	
3 1/4	..	111.6	82.8	112.4	83.4	113.2	84.0	114.0	84.6	114.9	85.2	115.7	85.8	..	4 3/4
	37	111.0	83.7	111.8	84.3	112.6	84.9	113.4	85.5	114.2	86.1	115.0	86.7	53	
	38	109.5	85.6	110.3	86.2	111.1	86.8	111.9	87.4	112.7	88.0	113.5	88.7	52	
	39	108.0	87.5	108.8	88.1	109.6	88.7	110.4	89.4	111.1	90.0	111.9	90.6	51	
3 1/2	..	107.4	88.2	108.2	88.8	109.0	89.4	109.8	90.1	110.5	90.7	111.3	91.3	..	4 1/2
	40	106.5	89.3	107.2	90.0	108.0	90.6	108.8	91.3	109.5	91.9	110.3	92.6	50	
	41	104.9	91.2	105.7	91.8	106.4	92.5	107.2	93.2	107.9	93.8	108.7	94.5	49	
														48	
3 3/4	42	103.3	93.0	104.0	93.7	104.8	94.3	105.5	95.0	106.3	95.7	107.0	96.4	..	4 1/4
	..	103.0	93.3	103.7	94.0	104.5	94.7	105.2	95.4	106.0	96.0	106.7	96.7	47	
	43	101.7	94.8	102.4	95.5	103.1	96.2	103.9	96.8	104.6	97.5	105.3	98.2	46	
	44	100.0	96.6	100.7	97.3	101.4	97.9	102.1	98.6	102.9	99.3	103.6	100.0	45	4
4	45	98.3	98.3	99.0	99.0	99.7	99.7	100.4	100.4	101.1	101.1	101.8	101.8		
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		139		140		141		142		143		144		Rumos	

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Rumos Pt.	Rumos Gr.	Distancia 145 Lt.	145 Ap.	146 Lt.	146 Ap.	147 Lt.	147 Ap.	148 Lt.	148 Ap.	149 Lt.	149 Ap.	150 Lt.	150 Ap.	Rumos Gr.	Rumos Pt.
	1	145.0	2.5	146.0	2.5	147.0	2.6	148.0	2.6	149.0	2.6	150.0	2.6	89	
	2	144.9	5.1	145.9	5.1	146.9	5.1	147.9	5.2	148.9	5.2	149.9	5.2	88	
$\frac{1}{4}$	..	144.8	7.1	145.8	7.2	146.8	7.2	147.8	7.3	148.8	7.3	149.8	7.4	..	$7\frac{3}{4}$
	3	144.8	7.6	145.8	7.6	146.8	7.7	147.8	7.7	148.8	7.8	149.8	7.9	87	
	4	144.6	10.1	145.6	10.2	146.6	10.3	147.6	10.3	148.6	10.4	149.6	10.5	86	
	5	144.4	12.6	145.4	12.7	146.4	12.8	147.4	12.9	148.4	13.0	149.4	13.1	85	
$\frac{1}{2}$	..	144.3	14.2	145.3	14.3	146.3	14.4	147.3	14.5	148.3	14.6	149.3	14.7	..	$7\frac{1}{2}$
	6	144.2	15.2	145.2	15.3	146.2	15.4	147.2	15.5	148.2	15.6	149.2	15.7	84	
	7	143.9	17.7	144.9	17.8	145.9	17.9	146.9	18.0	147.9	18.2	148.9	18.3	83	
	8	143.6	20.2	144.6	20.3	145.6	20.5	146.6	20.6	147.5	20.7	148.5	20.9	82	
$\frac{3}{4}$	..	143.4	21.3	144.4	21.4	145.4	21.6	146.4	21.7	147.4	21.9	148.4	22.0	..	$7\frac{1}{4}$
	9	143.2	22.7	144.2	22.8	145.2	23.0	146.2	23.2	142.2	23.3	148.2	23.5	81	
	10	142.8	25.2	143.8	25.4	144.8	25.5	445.8	25.7	140.7	25.9	147.7	26.0	80	
	11	142.3	27.7	143.3	27.9	144.3	28.0	145.3	28.2	146.3	28.4	147.2	28.6	79	
1	..	142.2	28.5	143.2	28.5	144.2	28.7	145.2	28.9	146.1	29.1	147.1	29.3	..	7
	12	141.8	30.1	142.8	30.4	143.8	30.6	144.8	30.8	145.7	31.0	146.7	31.2	78	
	13	141.3	32.6	142.3	32.8	143.2	33.1	144.2	33.3	145.2	33.5	146.2	33.7	77	
	14	140.7	35.1	141.7	35.3	142.6	33.6	143.6	35.8	144.6	36.0	145.5	36.3	76	
$1\frac{1}{4}$	..	140.7	35.2	141.6	35.5	142.6	35.7	143.6	36.0	144.5	36.2	145.5	36.5	..	$6\frac{3}{4}$
	15	140.1	37.5	141.0	37.8	142.0	38.0	143.0	38.3	143.9	38.6	144.9	38.8	75	
	16	139.4	40.0	140.3	40.2	141.3	40.5	142.3	40.8	143.2	41.1	144.2	41.3	74	
$1\frac{1}{2}$	..	138.8	42.1	139.7	42.4	140.7	42.7	141.6	43.0	142.6	43.2	143.5	43.5	..	$6\frac{1}{2}$
	17	138.7	42.4	139.6	42.7	140.6	43.0	141.5	43.3	142.5	43.6	143.4	43.9	73	
	18	137.9	44.8	138.9	45.1	139.8	45.4	140.8	45.7	141.7	46.0	142.7	46.4	72	
	19	137.1	47.2	138.0	47.5	139.0	47.9	139.9	48.2	140.9	48.5	141.8	48.8	71	
$1\frac{3}{4}$	..	136.5	48.8	137.5	49.2	138.4	49.5	139.3	49.9	140.3	50.2	141.2	50.5	..	$6\frac{1}{4}$
	20	136.3	49.6	137.2	49.9	138.1	50.3	139.1	50.6	140.0	51.0	141.0	51.3	70	
	21	135.4	52.0	136.3	52.3	137.2	52.7	138.2	53.0	139.1	53.4	140.0	53.8	69	
	22	134.4	54.3	135.4	54.7	136.3	55.1	137.2	55.4	138.2	55.8	139.1	56.2	68	
2	..	134.0	55.5	134.9	55.9	135.8	56.3	136.7	56.6	137.7	57.0	138.6	57.4	..	6
	23	133.5	56.7	134.4	57.0	135.3	57.4	136.2	57.8	137.2	58.2	138.1	58.6	67	
	24	132.5	59.0	133.4	59.4	134.3	59.8	135.2	60.2	136.1	60.6	137.0	61.0	66	
	25	131.4	61.3	132.3	61.7	133.2	62.1	134.1	62.5	135.0	63.0	135.9	63.4	65	
$2\frac{1}{4}$	..	131.1	62.0	132.0	62.4	132.9	62.9	133.8	63.3	134.7	63.7	135.6	64.1	..	$5\frac{3}{4}$
	26	130.3	63.6	131.2	64.0	132.1	64.4	133.0	64.9	133.9	65.3	134.8	65.8	64	
	27	129.2	65.8	130.1	66.3	131.0	66.7	131.9	67.2	132.8	67.6	133.7	68.1	63	
	28	128.0	68.1	128.9	68.5	129.8	69.0	130.7	69.5	131.6	70.0	132.4	70.4	62	
$2\frac{1}{2}$	..	127.9	68.3	128.8	68.8	129.6	69.3	130.5	69.8	131.4	70.2	132.3	70.7	..	$5\frac{1}{2}$
	29	126.8	70.3	127.7	70.8	128.6	71.3	129.4	71.8	130.3	72.2	131.2	72.7	61	
	30	125.6	72.5	126.4	73.0	127.3	73.5	128.2	74.0	129.0	74.5	129.9	75.0	60	
$2\frac{3}{4}$	..	124.4	74.5	125.2	75.1	126.1	75.6	126.9	76.1	127.8	76.6	128.7	77.1	..	$5\frac{1}{4}$
	31	124.3	74.7	125.1	75.2	126.0	75.7	126.9	76.2	127.7	76.7	128.6	77.3	59	
	32	123.0	76.8	123.8	77.4	124.7	77.9	125.5	78.4	126.4	79.0	127.2	79.5	58	
	33	121.6	79.0	122.4	79.5	123.3	80.1	124.1	80.6	125.0	81.2	125.8	81.7	57	
3	..	120.6	80.6	121.4	81.1	122.2	81.7	123.1	82.2	123.9	82.8	124.7	83.3	..	5
	34	120.2	81.1	121.0	81.6	121.9	82.2	122.7	82.8	123.5	83.3	124.4	83.9	56	
	35	118.8	83.2	119.6	83.7	120.4	84.3	121.2	84.9	122.1	85.5	122.9	86.0	55	
	36	117.3	85.2	118.1	85.8	118.9	86.4	119.7	87.0	120.5	87.6	121.4	88.2	54	
$3\frac{1}{4}$	..	116.5	86.4	117.3	87.0	118.1	87.6	118.9	88.2	119.7	88.8	120.5	89.4	..	$4\frac{3}{4}$
	37	115.8	87.3	116.6	87.9	117.4	88.5	118.2	89.1	119.0	89.7	119.8	90.3	53	
	38	114.3	89.3	115.0	89.9	115.8	90.5	116.6	91.1	117.4	91.7	118.2	92.3	52	
	39	112.7	91.3	113.5	91.9	114.2	92.5	115.0	93.1	115.8	93.8	116.6	94.4	51	
$3\frac{1}{2}$	..	112.1	92.0	112.9	92.6	113.6	93.3	114.4	93.9	115.2	94.5	115.9	95.2	..	$4\frac{1}{2}$
	40	111.1	93.2	111.8	93.8	112.6	94.5	113.4	95.1	114.1	95.8	114.9	96.4	50	
	41	109.4	95.1	110.2	95.8	110.9	96.4	111.7	97.1	112.5	97.8	113.2	98.4	49	
	42	107.8	97.0	108.5	97.7	109.2	98.4	110.0	99.0	110.7	99.7	111.5	100.4	48	
$3\frac{3}{4}$	..	107.4	97.4	108.2	98.0	108.9	98.7	109.7	99.4	110.4	100.1	111.1	100.7	..	$4\frac{1}{4}$
	43	106.0	98.9	106.8	99.6	107.5	100.3	108.2	100.9	109.0	101.6	109.7	102.3	47	
	44	104.3	100.7	105.0	101.4	105.7	102.1	106.5	102.8	107.2	103.5	107.9	104.2	46	
4	45	102.5	102.5	103.2	103.2	103.9	103.9	104.7	104.7	105.4	105.4	106.1	106.1	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		145		146		147		148		149		150			Rumos

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Rumos Pt.	Gr.	Distancia 151 Lt.	151 Ap.	152 Lt.	152 Ap.	153 Lt.	153 Ap.	154 Lt.	154 Ap.	155 Lt.	155 Ap.	156 Lt.	156 Ap.	Rumos Gr.	Pt.
	1	151.0	2.6	152.0	2.7	153.0	2.7	154.0	2.7	155.0	2.7	156.0	2.7	89	
	2	150.9	5.3	151.9	5.3	152.9	5.3	153.9	5.4	154.9	5.4	155.9	5.4	88	
1/4	..	150.8	7.4	151.8	7.5	152.8	7.5	153.8	7.6	154.8	7.6	155.8	7.7	..	3/4
	3	150.8	7.9	151.8	8.0	152.8	8.0	153.8	8.1	154.8	8.1	155.8	8.2	87	
	4	150.6	10.5	151.6	10.6	152.6	10.7	153.6	10.7	154.6	10.8	155.6	10.9	86	
	5	150.4	13.2	151.4	13.2	152.4	13.3	153.4	13.4	154.4	13 5	155.4	13.6	85	
1/2	..	150.3	14.8	151.3	14.9	152.3	15.0	153.3	15.1	154.3	15.2	155.2	15.3	..	7 1/2
	6	150.2	15.8	151.2	15.9	152.2	16.0	153.2	16.1	154.2	16.2	155.1	16.3	84	
	7	149.9	18.4	150.9	18.5	151.9	18.6	152.9	18.8	153.8	18.9	154.8	19.0	83	
	8	149.5	21.0	150.5	21.2	151.5	21.3	152.5	21.4	153.5	21.6	154.5	21.7	82	
3/4	..	149.4	22.2	150.3	22.3	151.3	22.4	152.3	22.6	153.3	22.7	154.3	22.9	..	7 1/4
	9	149.1	23.6	150.1	23.8	151.1	23.9	152.1	24.1	153.1	24.2	154.1	24.4	81	
	10	148.7	26.2	149.7	26.4	150.7	26.6	151.7	26.7	152.6	26.9	153.6	27.1	80	
	11	148.2	28.8	149.2	29.0	150.2	29.2	151.2	29.4	152.2	29.6	153.1	29.8	79	
1	..	148.1	29.5	149.1	29.7	150.1	29.9	151.0	30.0	152.0	30.2	153.0	30.4	..	7
	12	147.7	31.4	148.7	31.6	149.7	31.8	150.6	32.0	151.6	32.2	152.6	32.4	78	
	13	147.1	34.0	148.1	34.2	149.1	34.4	150.1	34.6	151.0	34.9	152.0	35.1	77	
	14	146.5	36.5	147.5	36.8	148.5	37.0	149.4	37.3	150.4	37.5	151.4	37.7	76	
1 1/4	..	146.5	36.7	147.4	36.9	148.4	37.2	149.4	37.4	150.4	37.7	151.3	37.9	..	6 3/4
	15	145.9	39.1	146.8	39.3	147.8	39.6	148.8	39.9	149.7	40.1	150.7	40.4	75	
	16	145.2	41.6	146.1	41.9	147.1	42.2	148.0	42.4	149.0	42.7	150.0	43.0	74	
1 1/2	..	144.5	43.8	145.5	44.1	146.4	44.4	147.4	44.7	148.3	45.0	149.3	45.3	..	6 1/2
	17	144.4	44.1	145.4	44.4	146.3	44.7	147.3	45.0	148.2	45.3	149.2	45.6	73	
	18	143.6	46.7	144.6	47.0	145.5	47.3	146.5	47.6	147.4	47.0	148.4	48.2	72	
	19	142.8	49.2	143.7	49.5	144.7	49.8	145.6	50.1	146.6	50.5	147.5	50.8	71	
1 3/4	..	142.2	50.9	143.1	51.2	144.1	51.5	145.0	51.9	145.9	52.2	146.9	52.5	..	6 1/4
	20	141.9	51.6	142.8	52.0	143.8	52.3	144.7	52.7	145.7	53.0	146.6	53.4	70	
	21	141.0	54.1	141.9	54.5	142.8	54.8	143.8	55.2	144.7	55.5	145.6	55.9	69	
	22	140.0	56.6	140.9	56.9	141.9	57.3	142.8	57.7	143.7	58.1	144.6	58.4	68	
2	..	139.5	57.8	140.4	58.2	141.4	58.6	142.3	58.9	143.2	59.3	144.1	59.7	..	6
	23	139.0	59.0	139.9	59.4	140.8	59.8	141.8	60.2	142.7	60.6	143.6	61.0	67	
	24	137.9	61.4	138.9	61.8	139.8	62.2	140.7	62.6	141.6	63.0	142.5	63.5	66	
	25	136.9	63.8	137.8	64.2	138.7	64.7	139.6	65.1	140.5	65.5	141.4	65.9	65	
2 1/4	..	136.5	64.6	137.4	65.0	138.3	65.4	139.2	65.9	140.1	66.3	141.0	66.7	..	5 3/4
	26	135.7	66.2	136.6	66.6	137.5	67.1	138.4	67.5	139.3	67.9	140.2	68.4	64	
	27	134.5	68.6	135.4	69.0	136.3	69.5	137.2	69.9	138.1	70.4	139.0	70.8	63	
	28	133.3	70.9	134.2	71.4	135.1	71.8	136.0	72.3	136.9	72.8	137.7	73.2	62	
2 1/2	..	133.2	71.2	134.1	71.6	134.9	72.1	135.8	72.6	136.7	73.1	137.6	73.5	..	5 1/2
	29	132.1	73.2	132.9	73.7	133.8	74.2	134.7	74.7	135.6	75.1	136.4	75.6	61	
	30	130.8	75.5	131.6	76.0	132.5	76.5	133.4	77.0	134.2	77.5	135.1	78.0	60	
2 3/4	..	129.5	77.6	130.4	78.1	131.2	78.7	132.1	79.2	132.9	79.7	133.8	80.2	..	5 1/4
	31	129.4	77.8	130.3	78.3	131.1	78.8	132.0	79.3	132.9	79.8	133.7	80.3	59	
	32	128.1	80.1	128.9	80.5	129.8	81.1	130.6	81.6	131.4	82.1	132.3	82.7	58	
	33	126.6	82.2	127.5	82.8	128.3	83.3	129.2	83.9	130.0	84.4	130.8	85.0	57	
3	..	126.5	83.9	126.4	84.4	127.2	85.0	128.0	85.6	128.9	86.1	129.7	86.7	..	5
	34	125.2	84.4	126.0	85.0	126.8	85.6	127.7	86.1	128.5	86.7	129.3	87.2	56	
	35	123.7	86.6	124.5	87.2	125.3	87.8	126.1	88.3	127.0	88.9	127.8	89.5	55	
	36	122.2	88.8	123.0	89.3	123.8	89.9	124.6	90.5	125.4	91.1	126.2	91.7	54	
3 1/4	..	121.3	90.0	122.1	90.5	122.9	91.1	123.7	91.7	124.5	92.3	125.3	92.9	..	4 3/4
	37	120.6	90.9	121.4	91.5	122.2	92.1	123.0	92.7	123.8	93.3	124.6	93.9	53	
	38	119.0	93.0	119.8	93.6	120.6	94.2	121.4	94.8	122.1	95.4	122.9	96.0	52	
	39	117.3	95.0	118.1	95.7	118.9	96.3	119.7	96.9	120.5	97.5	121.2	98.2	51	
3 1/2	..	116.7	95.8	117.5	96.4	118.3	97.1	119.0	97.7	119.8	98.3	120.6	99.0	..	4 1/2
	40	115.7	97.1	116.4	97.7	117.2	98.3	118.0	99.0	118.7	99.6	119.5	100.3	50	
	41	114.0	99.1	114.7	99.7	115.5	100.4	116.2	101.0	117.0	101.7	117.7	102.3	49	
	42	112.2	101.0	113.0	101.7	113.7	102.4	114.4	103.0	115.2	103.7	115.9	104.4	48	
3 3/4	..	111.9	101.4	112.6	102.1	113.4	102.7	114.1	103.4	114.8	104.1	115.6	104.8	..	4 1/4
	43	110.4	103.0	111.2	103.7	111.9	104.3	112.6	105.0	113.4	105.7	114.1	106.4	47	
	44	108.6	104.9	109.3	105.6	110.1	106.3	110.8	107.0	111.5	107.7	112.2	108.4	46	
4	45	106.8	106.8	107.5	107.5	108.2	108.2	108.9	108.9	109.6	109.6	110.3	110.3	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		151		152		153		154		155		156			Rumos

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Rumos Pt.	Gr.	Distancia 157 Lt.	157 Ap.	158 Lt.	158 Ap.	159 Lt.	159 Ap.	160 Lt.	160 Ap.	161 Lt.	161 Ap.	162 Lt.	162 Ap.	Rumos Gr.	Pt.
	1	157.0	2.7	158.0	2.8	159.0	2.8	160.0	2.8	161.0	2.8	162.0	2.8	89	
	2	156.9	5.5	157.9	5.5	158.9	5.5	159.9	5.6	160.9	5.6	161.9	5.7	88	
1/4	..	156.8	7.7	157.8	7.8	158.8	7.8	159.8	7.9	160.8	7.9	161.8	8.0	..	7 3/4
	3	156.8	8.2	157.8	8.3	158.8	8.3	159.8	8.4	160.8	8.4	161.8	8.5	87	
	4	156.6	11.0	157.6	11.0	158.6	11.1	159.6	11.2	160.6	11.2	161.6	11.3	86	
	5	156.4	13.7	157.4	13.8	158.4	13.9	159.4	13.9	160.4	14.0	161.4	14.1	85	
1/2	..	156.2	15.4	157.2	15.5	158.2	15.6	159.2	15.7	160.2	15.8	161.2	15.9	..	7 1/2
	6	156.1	16.4	157.1	16.5	158.1	16.6	159.1	16.7	160.1	16.8	161.1	16.9	84	
	7	155.8	19.1	156.8	19.3	157.8	19.4	158.8	19.5	159.8	19.6	160.8	19.7	83	
	8	155.5	21.9	156.5	22.0	157.5	22.1	158.4	22.3	159.4	22.4	160.4	22.5	82	
3/4	..	155.3	23.0	156.3	23.2	157.3	23.3	158.3	23.5	159.3	23.6	160.2	23.8	..	7 1/4
	9	155.1	24.6	156.1	24.7	157.0	24.9	158.0	25.0	159.0	25.2	160.0	25.3	81	
	10	154.6	27.3	155.6	27.4	156.6	27.6	157.6	27.8	158.6	28.0	159.5	28.1	80	
	11	154.1	30.0	155.1	30.1	156.1	30.3	157.1	30.5	158.0	30.7	159.0	30.9	79	
1	..	154.0	30.6	155.0	30.8	155.9	31.0	156.9	31.2	157.9	31.4	158.9	31.6	.	7
	12	153.6	32.6	154.5	32.9	155.5	33.1	156.5	33.3	157.5	33.5	158.5	33.7	78	
	13	153.0	35.3	154.0	35.5	154.9	35.8	155.9	36.0	156.9	36.2	157.8	36.4	77	
	14	152.3	38.0	153.3	38.2	154.3	38.5	155.2	38.7	156.2	38.9	157.2	39.2	76	
1 1/4	..	152.3	38.2	153.3	38.4	154.2	38.6	155.2	38.9	156.2	39.1	157.1	39.4	..	6 3/4
	15	151.7	40.6	152.6	40.9	153.6	41.2	154.5	41.4	155.5	41.7	156.5	41.9	75	
	16	150.9	43.3	151.9	43.6	152.8	43.8	153.8	44.1	154.8	44.4	155.7	44.7	74	
1 1/2	..	150.2	45.6	151.2	45.9	152.2	46.1	153.1	46.4	154.1	46.7	155.0	47.0	..	6 1/2
	17	150.1	45.9	151.1	46.2	152.1	46.5	153.0	46.8	154.0	47.1	154.9	47.4	73	
	18	149.3	48.5	150.3	48.8	151.2	49.1	152.2	49.4	153.1	49.8	154.1	50.1	72	
	19	148.4	51.1	149.4	51.4	150.3	51.8	151.3	52.1	152.2	52.4	153.2	52.7	71	
1 3/4	..	147.8	52.9	148.8	53.2	149.7	53.6	150.6	53.9	151.6	54.2	152.5	54.6	..	6 1/4
	20	147.5	53.7	148.5	54.0	149.4	54.4	150.4	54.7	151.3	55.1	152.2	55.4	70	
	21	146.6	56.3	147.5	56.6	148.4	57.0	149.4	57.3	150.3	57.7	151.2	58.1	69	
	22	145.6	58.8	146.5	59.2	147.4	59.6	148.3	59.9	149.3	60.3	150.2	60.7	68	
2	..	145.1	60.1	146.0	60.5	146.9	60.9	147.8	61.2	148.7	61.6	149.7	62.0	..	6
	23	144.5	61.3	145.4	61.7	146.4	62.1	147.3	62.5	148.2	62.9	149.1	63.3	67	
	24	143.4	63.9	144.3	64.3	145.3	64.7	146.2	65.1	147.1	65.5	148.0	65.9	66	
	25	142.3	66.4	143.2	66.8	144.1	67.2	145.0	67.6	145.9	68.0	146.8	68.5	65	
2 1/4	..	141.9	67.1	142.8	67.6	143.7	68.0	144.6	68.4	145.5	68.8	146.4	69.3	..	5 3/4
	26	141.1	68.8	142.0	69.3	142.9	69.7	143.8	70.1	144.7	70.6	145.6	71.0	64	
	27	139.9	71.3	140.8	71.7	141.7	72.2	142.6	72.6	143.5	73.1	144.3	73.5	63	
	28	138.6	73.7	139.5	74.2	140.4	74.6	141.3	75.1	142.2	75.6	143.0	76.1	62	
2 1/2	..	138.5	74.0	139.3	74.5	140.2	74.9	141.1	75.4	142.0	75.9	142.9	76.4	..	5 1/2
	29	137.3	76.1	138.2	76.6	139.1	77.1	139.9	77.6	140.8	78.1	141.7	78.5	61	
	30	136.0	78.5	136.8	79.0	137.7	79.5	138.6	80.0	139.4	80.5	140.3	81.0	60	
2 3/4	..	134.7	80.7	135.5	81.2	136.4	81.7	137.2	82.3	138.1	82.8	138.9	83.3	..	5 1/4
	31	134.6	80.9	135.4	81.4	136.3	81.9	137.1	82.4	138.0	82.9	138.9	83.4	59	
	32	133.1	83.2	134.0	83.7	134.8	84.3	135.7	84.8	136.5	85.3	137.4	85.8	58	
	33	131.7	85.5	132.5	86.1	133.3	86.6	134.2	87.1	135.0	87.7	135.9	88.2	57	
3	..	130.5	87.2	131.4	87.8	132.2	88.3	133.0	88.9	133.9	89.4	134.7	90.0	..	5
	34	130.2	87.8	131.0	88.4	131.8	88.9	132.6	89.5	133.5	90.0	134.3	90.6	56	
	35	128.6	90.1	129.4	90.6	130.2	91.2	131.1	91.8	131.9	92.3	132.7	92.9	55	
	36	127.0	92.3	127.8	92.9	128.6	93.5	129.4	94.0	130.3	94.6	131.1	95.2	54	
3 1/4	..	126.1	93.5	126.9	94.1	127.7	94.7	128.5	95.3	129.3	95.9	130.1	96.5	..	4 3/4
	37	125.4	94.5	126.2	95.1	127.0	95.7	127.8	96.3	128.6	96.9	129.4	97.5	53	
	38	123.7	96.7	124.5	97.3	125.3	97.9	126.1	98.5	126.9	99.1	127.7	99.7	52	
	39	122.0	98.8	122.8	99.4	123.6	100.1	124.3	100.7	125.1	101.3	125.9	101.9	51	
3 1/2	..	121.4	99.6	122.1	100.2	122.9	100.9	123.7	101.5	124.4	102.1	125.2	102.8	..	4 1/2
	40	120.3	100.9	121.0	101.6	121.8	102.2	122.6	102.8	123.3	103.5	124.1	104.1	50	
	41	118.5	103.0	119.2	103.7	120.0	104.3	120.8	105.0	121.5	105.6	122.3	106.3	49	
	42	116.7	105.1	117.4	105.7	118.2	106.4	118.9	107.1	119.6	107.7	120.4	108.4	48	
3 3/4	..	116.3	105.4	117.1	106.1	117.8	106.8	118.5	107.4	119.3	108.1	120.0	108.8	..	4 1/4
	43	114.8	107.1	115.6	107.8	116.3	108.4	117.0	109.1	117.7	109.8	118.5	110.5	47	
	44	112.9	109.1	113.7	109.8	114.4	110.5	115.1	111.1	115.8	111.8	116.5	112.5	46	
4	45	111.0	111.0	111.7	111.7	112.4	112.4	113.1	113.1	113.8	113.8	114.6	114.6	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		157		158		159		160		161		162		Rumos	

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Rumos Pt.	Gr.	Distancia 163 Lt.	163 Ap.	164 Lt.	164 Ap.	165 Lt.	165 Ap.	166 Lt.	166 Ap.	167 Lt.	167 Ap.	168 Lt.	168 Ap.	Rumos Gr.	Pt.
	1	163.0	2.8	164.0	2.9	165.0	2.9	166.0	2.9	167.0	2.9	168.0	2.9	89	
	2	162.9	5.7	163.9	5.7	164.9	5.8	165.9	5.8	166.9	5.8	167.9	5.9	88	
1/4	..	162.8	8.0	163.8	8.1	164.8	8.1	165.8	8.2	166.8	8.2	167.8	8.2	..	7 3/4
	3	162.8	8.5	163.8	8.6	164.8	8.6	165.8	8.7	166.8	8.7	167.8	8.8	87	
	4	162.6	11.4	163.6	11.4	164.6	11.5	165.6	11.6	166.6	11.6	167.6	11.7	86	
	5	162.4	14.2	163.4	14.3	164.4	14.4	165.4	14.5	166.4	14.6	167.4	14.6	85	
1/2	..	162.2	16.0	163.2	16.1	164.2	16.2	165.2	16.3	166.2	16.4	167.2	16.5	..	7 1/2
	6	162.1	17.0	163.1	17.1	164.1	17.2	165.1	17.4	166.1	17.5	167.1	17.6	84	
	7	161.8	19.9	162.8	20.0	163.8	20.1	164.8	20.2	165.8	20.4	166.7	20.5	83	
	8	161.4	22.7	162.4	22.8	163.4	23.0	164.4	23.1	165.4	23.2	166.4	23.4	82	
3/4	..	161.2	23.9	162.2	24.1	163.2	24.2	164.2	24.4	165.2	24.5	166.2	24.6	..	7 1/4
	9	161.0	25.5	162.0	25.7	163.0	25.8	164.0	26.0	164.9	26.1	165.9	26.3	81	
	10	160.5	28.3	161.5	28.5	162.5	28.7	163.5	28.8	164.5	29.0	165.4	29.2	80	
	11	160.0	31.1	161.0	31.3	162.0	31.5	163.0	31.7	163.9	31.9	164.9	32.1	79	
1	..	159.9	31.8	160.8	32.0	161.8	32.2	162.8	32.4	163.8	32.6	164.8	32.8	..	7
	12	159.4	33.9	160.4	34.1	161.4	34.3	162.4	34.5	163.4	34.7	164.3	34.9	78	
	13	158.8	36.7	159.8	36.9	160.8	37.1	161.7	37.3	162.7	37.6	163.7	37.8	77	
	14	158.2	39.4	159.1	39.7	160.1	39.9	161.1	40.2	162.0	40.4	163.0	40.6	76	
1/4	..	158.1	39.6	159.1	39.9	160.1	40.1	161.0	40.3	162.0	40.6	163.0	40.8	..	6 3/4
	15	157.4	42.2	158.4	42.4	159.4	42.7	160.3	43.0	161.3	43.2	162.3	43.5	75	
	16	156.7	44.9	157.6	47.2	158.6	45.5	159.6	45.8	160.5	46.0	161.5	46.3	74	
1/2	..	156.0	47.3	156.9	47.6	157.9	47.9	158.9	48.2	159.8	48.5	160.8	48.8	..	6 1/2
	17	155.9	47.7	156.8	47.9	157.8	48.2	158.7	48.5	159.7	48.8	160.7	49.1	73	
	18	155.0	50.4	156.0	50.7	156.9	51.6	157.9	51.3	158.8	51.6	159.8	51.9	72	
	19	154.1	53.1	155.1	53.4	156.0	53.7	157.0	54.0	157.9	54.4	158.8	54.7	71	
3/4	..	153.5	54.9	154.4	55.2	155.3	55.6	156.3	55.9	157.2	56.3	158.2	56.6	..	6 1/4
	20	153.2	55.7	154.1	56.1	155.0	56.4	156.0	56.8	156.9	57.1	157.9	57.5	70	
	21	152.2	58.4	153.1	58.8	154.0	59.1	155.0	59.5	155.9	59.8	156.8	60.2	69	
	22	151.1	61.1	152.1	61.4	153.0	61.8	153.9	62.2	154.8	62.6	155.8	62.9	68	
2	..	150.6	62.4	151.5	62.8	152.4	63.1	153.4	63.5	154.3	63.9	155.2	64.3	..	6
	23	150.0	63.7	151.0	64.1	151.9	64.5	152.8	64.9	153.7	65.3	154.6	65.6	67	
	24	148.9	66.3	149.8	66.7	150.7	67.1	151.6	67.5	152.6	67.9	153.5	68.3	66	
	25	147.7	68.9	148.6	69.3	149.5	69.7	150.4	70.2	151.4	70.6	152.3	71.0	65	
1/4	..	147.3	69.7	148.3	70.1	149.2	70.6	150.1	71.0	151.0	71.4	151.9	71.8	..	5 3/4
	26	146.5	71.5	147.4	71.9	148.3	72.3	149.2	72.8	150.1	73.2	151.0	73.6	64	
	27	145.2	74.0	146.1	74.5	147.0	74.9	147.9	75.4	148.8	75.8	149.7	76.3	63	
1/2	28	143.9	76.5	144.8	77.0	145.7	77.5	146.6	77.9	147.5	78.4	148.3	78.9	62	
	..	143.8	76.8	144.6	77.3	145.5	77.8	146.4	78.2	147.3	78.7	148.2	79.2	..	5 1/2
	29	142.6	79.0	143.4	79.5	144.3	80.0	145.2	80.5	146.1	81.0	146.9	81.4	61	
	30	141.2	81.5	142.0	82.0	142.9	82.5	143.8	83.0	144.6	83.5	145.5	84.0	60	
3/4	..	139.8	83.8	140.7	84.3	141.5	84.8	142.4	85.3	143.2	85.8	144.1	86.4	..	5 1/4
	31	139.7	84.0	140.6	84.5	141.4	85.0	142.3	85.5	143.1	86.0	144.0	86.5	59	
	32	138.2	86.4	139.1	86.9	139.9	87.4	140.8	88.0	141.6	88.5	142.5	89.0	58	
	33	136.7	88.8	136.5	89.3	138.4	88.9	139.2	90.4	140.1	91.0	140.9	91.5	57	
3	..	135.5	90.6	136.4	91.1	137.2	91.7	138.0	92.2	138.9	92.8	139.7	93.3	..	5
	34	135.1	91.1	136.0	91.7	136.8	92.3	137.6	92.8	138.4	93.4	139.3	93.9	56	
	35	133.5	93.5	134.3	94.1	135.2	94.6	136.0	95.2	136.8	95.8	137.6	96.4	55	
	36	131.9	95.8	132.7	96.4	133.5	97.0	134.3	97.6	135.1	98.2	135.9	98.7	54	
3/4	..	130.9	97.1	131.7	97.7	132.5	98.3	133.3	98.9	134.1	99.5	134.9	100.1	..	4 3/4
	37	130.2	98.1	131.0	98.7	131.8	99.3	132.6	99.9	133.4	100.5	134.2	101.1	53	
	38	128.4	100.4	129.2	101.0	131.0	101.6	130.8	102.2	131.6	102.8	132.4	103.4	52	
1/2	39	126.7	102.6	127.5	103.2	128.2	103.8	129.0	104.5	129.8	105.1	130.6	105.7	51	
	..	126.0	103.4	126.8	104.0	127.5	104.7	128.3	105.3	129.1	105.9	129.9	106.6	..	4 1/2
	40	124.9	104.8	125.6	105.4	126.4	106.1	127.2	106.7	127.9	107.3	128.7	108.0	50	
	41	123.0	106.9	123.8	107.6	124.5	108.2	125.3	108.9	126.0	109.6	126.8	110.2	49	
3/4	42	121.1	109.1	121.9	109.7	122.6	110.4	123.4	111.1	124.1	111.7	124.8	112.4	48	
	..	120.8	109.5	121.5	110.1	122.3	110.8	123.0	111.5	123.7	112.1	124.5	112.8	..	4 1/4
	43	119.2	111.2	119.9	111.8	120.7	112.5	121.4	113.2	122.1	113.9	122.9	114.6	47	
	44	117.3	113.2	118.0	113.9	118.7	114.6	119.4	115.3	120.1	116.0	120.8	116.7	46	
4	45	115.3	115.3	116.0	116.0	116.7	116.7	117.4	117.4	118.1	118.1	118.8	118.8	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		163		164		165		166		167		168		Rumos	

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Rumos Pt.	Gr.	Distancia 169 Lt.	169 Ap.	170 Lt.	170 Ap.	171 Lt.	171 Ap.	172 Lt.	172 Ap.	173 Lt.	173 Ap.	174 Lt.	174 Ap.	Rumos Gr.	Pt.
	1	169.0	2.9	170.0	3.0	171.0	3.0	172.0	3.0	173 0	3.0	174.0	3.0	89	
	2	168.9	5.9	169.9	5.9	170.9	6.0	171.9	6.0	172.9	6.0	173.9	6.1	88	
1/4	..	168.8	8.3	169.8	8.3	170.8	8.4	171.8	8.4	172.8	8.5	173.8	8.5	..	7 3/4
	3	168.8	8.8	169.8	8.9	170.8	8.9	171.8	9.0	172.8	9.1	173.8	9.1	87	
	4	168.6	11.8	169.6	11.9	170.6	11.9	171.6	12.0	172.6	12.1	173 6	12.1	86	
	5	168.4	14.7	169.4	14.8	170.3	14.9	171.3	15.0	172.3	15.1	173.3	15.2	85	
1/2	..	168.2	16.6	169.2	16.7	170.2	16.8	171.2	16.9	172.2	17.0	173.2	17.1	..	7 1/2
	6	168.1	17.7	169.1	17.8	170.1	17.9	171.1	18.0	172.1	18.1	173.0	18.2	84	
	7	167.7	20.6	168.7	20.7	169.7	20.8	170.7	21.0	171.7	21.1	172.7	21.2	83	
	8	167.4	23.5	168.3	23.7	169.3	23.8	170.3	23.9	171.3	24.1	172.3	24.2	82	
3/4	..	167.2	24.8	168.2	24.9	169.1	25.1	170.1	25.2	171.1	25.4	172.1	25.5	..	7 1/4
	9	166.9	26.4	167.9	26.6	168.9	26.8	169.9	26.9	170.9	27.1	171.9	27.2	81	
	10	166.4	29.3	167.4	29.5	168.4	29.7	169.4	29.9	170.4	30.0	171.4	30.2	80	
	11	165.9	32.2	166.9	32.4	167.9	32.6	168.8	32.8	169.8	33.0	170.8	33.2	79	
1	..	165.7	33.0	166.7	33.2	167.7	33.4	168.7	33.6	169.7	33.8	170.7	34.0	..	7
	12	165.3	35.1	166.3	35.3	167.3	35.6	168.2	35.8	169.2	36.0	170.2	36.2	78	
	13	164.7	38.0	165.6	38.2	166.6	38.5	167.6	38.7	168.6	38.9	169.5	39.1	77	
	14	164.0	40.9	165.0	41.1	165.9	41.4	166.9	41.6	167.9	41.9	168.8	42.1	76	
1 1/4	..	163.9	41.1	164.9	41.3	165.9	41.6	166.8	41.8	167.8	42.0	168.8	42.3	..	6 3/4
	15	163.2	43.7	164.2	44.0	165.2	44.3	166.1	44.5	167.1	44.8	168.1	45.0	75	
	16	162.5	46.6	163.4	46.9	164.4	47.1	165.3	47.4	166.3	47.7	167.3	48.0	74	
1 1/2	..	161.7	49.1	162.7	49.3	163.6	49.6	164.6	49.9	165.6	50.2	166.5	50.5	..	6 1/2
	17	161.6	49.4	162.0	49.7	163.5	50.0	164.5	50.3	165.4	50.6	166.4	50.9	73	
	18	160.7	52.2	161.7	52.5	162.6	52.8	163.6	53.2	164.5	53.5	165.5	53.8	72	
	19	159.8	55.0	160.7	55.3	161.7	55.7	162.6	56.0	163.6	56.3	164.5	56.6	71	
1 3/4	..	159.1	56.9	160.1	57.3	161.0	57.6	161.9	57.9	162.9	58.3	163.8	58.6	..	6 1/4
	20	158.8	57.8	159.7	58.1	160.7	58.5	161.6	58.8	162.6	59.2	163.5	59.5	70	
	21	157.8	60.6	158.7	60.9	159.6	61.3	160.6	61.6	161.5	62.0	162.4	62.4	69	
	22	156.7	63.3	157.6	63.7	158.5	64.1	159.5	64.4	160.4	64.8	161.3	65.2	68	
2	..	156.1	64.7	157.1	65.1	158.0	65.4	158.9	65.8	159.8	66.2	160.8	66.6	..	6
	23	155.6	66.0	156.5	66.4	157.4	66.8	158.3	67.2	159.2	67.6	160.2	68.0	67	
	24	154.4	68.7	155.3	69.1	156.2	69.6	157.1	70.0	158.0	70.4	159.0	70.8	66	
	25	153.2	71.4	154.1	71.8	155.0	72.3	155.9	72.7	156.8	73.1	157.7	73.5	65	
2 1/4	..	152.8	72.3	153.7	72.7	154.6	73.1	155.5	73.6	156.4	74.0	157.3	74.4	..	5 3/4
	26	151.9	74.1	152.8	74.5	153.7	75.0	154.6	75.4	155.5	75.8	156.4	76.3	64	
	27	150.6	76.7	151.5	77.2	152.4	77.6	153.3	78.1	154.1	78.5	155.0	79.0	63	
	28	149.2	79.3	150.1	79.8	151.0	80.3	151.9	80.7	152.7	81.2	153.6	81.7	62	
2 1/2	..	149.0	79.7	149.9	80.1	150.8	80.6	151.7	81.1	152.6	81.5	153.5	82.0	..	5 1/2
	29	147.8	81.9	148.7	82.4	149.6	82.9	150.4	83.4	151.3	83.9	152.2	84.4	61	
	30	146.4	84.5	147.2	85.0	148.1	85.5	149.0	86.0	149.8	86.5	150.7	87.0	60	
2 3/4	..	145.0	86.9	145.8	87.4	146.7	87.9	147.5	88.4	148.4	88.9	149.2	89.4	..	5 1/4
	31	144.9	87.0	145.7	87.6	146.6	88.1	147.4	88.6	148.3	89.1	149.1	89.6	59	
	32	143.3	89.6	144.2	90.1	145.0	90.6	145.9	91.1	146.7	91.7	147.6	92.2	58	
	33	141.7	92.0	142.6	92.6	143.4	93.1	144.3	93.7	145.1	94.2	145.9	94.8	57	
3	..	140.5	93.9	141.3	94.4	142.2	95.0	143.0	95.6	143.8	96.1	144.7	96.7	..	5
	34	140.1	94.5	140.9	95.1	141.8	95.6	142.6	96.2	143.4	96.7	144.3	97.3	56	
	35	138.4	96.9	139.3	97.5	140.1	98.1	140.9	98.7	141.7	99.2	142.5	99.8	55	
	36	136.7	99.3	137.5	99.9	138.3	100.5	139.2	101.1	140.0	101.7	140.8	102.3	54	
3 1/4	..	135.7	100.7	136.5	101.3	137.3	101.9	138.1	102.5	138.9	103.1	139.8	103.7	..	4 3/4
	37	135.0	101.7	135.8	102.3	136.6	102.9	137.4	103.5	138.2	104.1	139 0	104.7	53	
	38	133.2	104.0	134.0	104.7	134.7	105.3	135.5	105.9	136.3	106.5	137.1	107.1	52	
	39	131.3	106.4	132.1	107.0	132.9	107.6	133.7	108.2	134.4	108.9	135.2	109.5	51	
3 1/2	..	130.6	107.2	131.4	107.8	132.2	108.5	133.0	109.1	133.7	109.7	134.5	110.4	..	4 1/2
	40	129.5	108.6	130.2	109.3	131.0	109.9	131.8	110.6	132.5	111.2	133.3	111.8	50	
	41	127.5	110.9	128.3	111.5	129.1	112.2	129.8	112.8	130.6	113.5	131.3	114.2	49	
	42	125.6	113.1	126.3	113.8	127.1	114.4	127.8	115.1	128.6	115.8	129.3	116.4	48	
3 3/4	..	125.2	113.5	126.0	114.2	126.7	114.8	127.4	115.5	128.2	116.2	128.9	116.8	..	4 1/4
	43	123.6	115.3	124.3	115.9	125.1	116.6	125.8	117.3	126.5	118.0	127.3	118.7	47	
	44	121.6	117.4	122.3	118.1	123.0	118.8	123.7	119.5	124.4	120.2	125.2	120.9	46	
4	45	119.5	119.5	120.2	120.2	120.9	120.9	121.6	121.6	122.3	122.3	123.0	123.0	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		169		170		171		172		173		174		Rumos	

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Estima

Rumos Pt.	Gr.	Distancia 175 Lt.	175 Ap.	176 Lt.	176 Ap.	177 Lt.	177 Ap.	178 Lt.	178 Ap.	179 Lt.	179 Ap.	180 Lt.	180 Ap.	Rumos Gr.	Pt.
	1	175.0	3.1	176.0	3.1	177.0	3.1	178.0	3.1	179.0	3.1	180.0	3.1	89	
	2	174.9	6.1	175.9	6.1	176.9	6.2	177.9	6.2	178.9	6.2	179.9	6.3	88	
1/4	..	174.8	8.6	175.8	8.6	176.8	8.7	177.8	8.7	178.8	8.8	179.8	8.8	..	7 3/4
	3	174.8	9.2	175.8	9.2	176.8	9.3	177.8	9.3	178.8	9.4	179.8	9.4	87	
	4	174.6	12.2	175.6	12.3	176.6	12.3	177.6	12.4	178.6	12.5	179.6	12.6	86	
	5	174.3	15.3	175.3	15.3	176.3	15.4	177.3	15.5	178.3	15.6	179.3	15.7	85	
1/2	..	174.2	17.2	175.2	17.3	176.1	17.4	177.1	17.4	178.1	17.5	179.1	17.6	..	7 1/2
	6	174.0	18.3	175.0	18.4	176.0	18.5	177.0	18.6	178.0	18.7	179.0	18.8	84	
	7	173.7	21.3	174.7	21.4	175.7	21.6	176.7	21.7	177.7	21.8	178.7	21.9	83	
	8	173.3	24.4	174.3	24.5	175.3	24.6	1,6.3	24.8	177.3	24.9	178.2	25.1	82	
3/4	..	173.1	25.7	174.1	25.8	175.1	26.0	176.1	26.1	177.1	26.3	178.0	26.4	..	7 1/4
	9	172.8	27.4	173.8	27.5	174.8	27.7	175.8	27.8	176.8	28.0	177.8	28.2	81	
	10	172.3	30.4	173.3	30.6	174.3	30.7	175.3	30.9	176.3	31.1	177.3	31.3	80	
	11	171.8	33.4	172.8	33.6	173.7	33.8	174.7	34.0	175.7	34.2	176.7	34.3	79	
1	..	171.6	34.1	172.6	34.3	173.6	34.5	174.6	34.7	175.6	34.9	176.5	35.1	..	7
	12	171.2	36.4	172.2	36.6	173.1	36.8	174.1	37.0	175.1	37.2	176.1	37.4	78	
	13	170.5	39.4	171.5	39.6	172.5	39.8	173.4	40.0	174.4	40.3	175.4	40.5	77	
	14	169.8	42.3	170.8	42.6	171.7	42.8	172.7	43.1	173.7	43.3	174.7	43.5	76	
1/4	..	169.8	42.5	170.7	42.8	171.7	43.0	172.7	43.3	173.6	43.5	174.6	43.7	..	6 3/4
	15	169.0	45.3	170.0	45.6	171.0	45.8	171.9	46.1	172.9	46.3	173.9	46.6	75	
	16	168.2	48.2	169.2	48.5	170.1	48.8	171.1	49.1	172.1	49.3	173.0	49.6	74	
1/2	..	167.5	50.8	168.4	51.1	169.4	51.4	170.3	51.7	171.3	52.0	172.3	52.2	..	6 1/2
	17	167.4	51.2	168.3	51.5	169.3	51.7	170.2	52.0	171.2	52.3	172.1	52.6	73	
	18	166.4	54.1	167.4	54.4	168.3	54.7	169.3	55.0	170.2	55.3	171.2	55.6	72	
	19	165.5	57.0	166.4	57.3	167.4	57.6	168.3	58.0	169.2	58.3	170.2	58.6	71	
3/4	..	164.8	59.0	165.7	59.3	166.6	59.6	167.6	60.0	168.5	60.3	169.5	60.6	..	6 1/4
	20	164.4	59.9	165.4	60.2	166.3	60.5	167.3	60.9	168.2	61.2	169.1	61.6	70	
	21	163.4	62.7	164.3	63.1	165.2	63.4	166.2	63.8	167.1	64.1	168.0	64.5	69	
	22	162.3	65.6	163.2	65.9	164.1	66.3	165.0	66.7	166.0	67.1	166.9	67.4	68	
2	..	161.7	67.0	162.6	67.4	163.5	67.7	164.5	68.1	165.4	68.5	166.3	68.9	.	6
	23	161.1	68.4	162.0	68.8	162.9	69.2	163.8	69.6	164.8	69.9	165.7	70.3	67	
	24	159.9	71.2	160.8	71.6	161.7	72.0	162.6	72.4	163.5	72.8	164.4	73.2	66	
	25	158.6	74.0	159.5	74.4	160.4	74.8	161.3	75.2	162.2	75.6	163.1	76.1	65	
1/4	..	158.2	74.8	159.1	75.3	160.0	75.7	160.9	76.1	161.8	76.5	162.7	77.0	..	5 3/4
	26	157 3	76.7	158.2	77.2	159.1	77.6	160.0	78.0	160.9	78.5	161.8	78.9	64	
	27	155.9	79.4	156.8	79.9	157.7	80.4	158.6	80.8	159.5	81.3	160.4	81.7	63	
	28	154.5	82.2	155.4	82.6	156.3	83.1	157.2	83.6	158.0	84.0	158.9	84.5	62	
1/2	..	154.3	82.5	155.2	83.0	156.1	83.4	157.0	83.9	157.9	84.4	158 8	84.8	..	5 1/2
	29	153.1	84.8	153.9	85.3	154.8	85.8	155.7	86.3	156.0	86.8	157.4	87.3	61	
	30	151.6	87.5	152.4	88.0	153.3	88.5	154.2	89.0	155.0	89.5	155.9	90.0	60	
3/4	..	150.1	90.0	151.0	90.5	151.8	91.0	152.7	91.5	153.5	92.0	154.4	92.5	..	5 1/4
	31	150.0	90.1	150.9	90.6	151.7	91.2	152.6	91.7	153.4	92.2	154.3	92.7	59	
	32	148.4	92.7	149.3	93.3	150.1	93.8	151.0	94.3	151.8	94.9	152.6	95.4	58	
	33	146.8	95.3	147.6	95.9	148.4	96.4	149.3	96.9	150.1	97.5	151.0	98.0	57	
3	..	145.5	97.2	146.3	97.8	147.2	98.3	148.0	98.9	148.8	99.4	149.7	100.0	..	5
	34	145.1	97.9	145.9	98.4	146.7	99.0	147.6	99.5	148.4	100.1	149.2	100.7	56	
	35	143.4	100.4	144.2	100.9	145.0	101.5	145.8	102.1	146.6	102.7	147.4	103.2	55	
	36	141.6	102.9	142.4	103.5	143.2	104.0	144.0	104.6	144.8	105.2	145.6	105.8	54	
1/4	..	140.6	104.2	141.4	104.8	142.2	105.4	143.0	106.0	143.8	106.6	144 6	107.2	..	4 3/4
	37	139.8	105.3	140.6	105.9	141.4	106.5	142.2	107.1	143.0	107.7	143.8	108.3	53	
	38	137.9	107.7	138.7	108.4	139.5	109.0	140.3	109.6	141.1	110.2	141.8	110.8	52	
	39	136.0	110.1	136.8	110.8	137.6	111.4	138.3	112.0	139.1	112.6	139.9	113.3	51	
1/2	..	135.3	111.0	136.0	111.6	136.8	112.3	137.6	112.9	138.4	113.6	139.1	114.2	..	4 1/2
	40	134.1	112.5	134.8	113.1	135.6	113.8	136.4	114.4	137.1	115.1	137.9	115.7	50	
	41	132.1	114.8	132.8	115.5	133.6	116.1	134.3	116.8	135.1	117.4	135.8	118.1	49	
	42	130.1	117.1	130.8	117.8	131.5	118.4	132.3	119.1	133.0	119.8	133.8	120.4	48	
3/4	.	129.7	117.5	130.4	118.2	131.1	118.9	131.9	119.5	132.6	120.2	133.4	120.9	..	4 1/4
	43	128.0	119.3	128.7	120.0	129.4	120.7	130.2	121.4	130.9	122.1	131.6	122.8	47	
	44	125.9	121.6	126.6	122.3	127.3	123.0	128.0	123.6	128.8	124.3	129.5	125.0	46	
4	45	123.7	123.7	124.5	124.5	125.2	125.2	125.9	125.9	126.6	126.6	127.3	127.3	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		175		176		177		178		179		180		Rumos	

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Distancia												Rumos	
181		182		183		184		185		186			
Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
181.0	3.2	182.0	3.2	183.0	3.2	184.0	3.2	185.0	3.2	186.0	3.2	89	
180.9	6.3	181.9	6.4	182.9	6.4	183.9	6.4	184.9	6 5	185.9	6.5	88	
180.8	8.9	181.8	8.9	182.8	9.0	183.8	9.0	184.8	9.1	185.8	9.1		$7\frac{3}{4}$
180.8	9.5	181.8	9.5	182.7	9.6	183.7	9.6	184.7	9.7	185.7	9.7	87	
180.6	12.6	181.6	12.7	182.6	12.8	183.6	12.8	184.5	12.9	185.5	13.0	86	
180.3	15.8	181.3	15.9	182.3	15.9	183.3	16.0	184.3	16.1	185.3	16.2	85	
180.1	17.7	181.1	17.8	182.1	17 9	183.1	18.0	184.1	18.1	185.1	18.2	..	$7\frac{1}{2}$
180.0	18.9	181.0	19.0	182.0	19.1	183.0	19.2	184.0	19.3	185.0	19.4	84	
179.7	22.1	180.6	22.2	181.6	22.3	182.6	22.4	183.6	22.5	184.6	22.7	83	
179.2	25.2	180.2	25.3	181.2	25.5	182.2	25.6	183.2	25.7	184.2	25.9	82	
179.0	26.6	180.0	26.7	181.0	26.8	182.0	27.0	183.0	27.1	184.0	27.3	..	$7\frac{1}{4}$
178.8	28.3	179.8	28.5	180.7	28.6	181.7	28.8	182.7	28.9	183.7	29.1	81	
178.3	31.4	179.2	31.6	180.2	31.8	181.2	32 0	182.2	32.1	183.2	32.3	80	
177.7	34.5	178.7	34.7	179.6	34.9	180.6	35.1	181.6	35.3	182.6	35.5	79	
177.5	35.3	178.5	35.5	179.5	35.7	180.5	35 9	181.4	36.1	182.4	36.3	..	7
177.0	37.6	178.0	37.8	179.0	38.0	180.0	38.3	181.0	38.5	181.9	38.7	78	
176.4	40.7	177.3	40.9	178.3	41.2	179.3	41.4	180.3	41.6	181.2	41.8	77	
175.6	43.8	176.6	44.0	177.6	44.3	178.5	44.5	179.5	44.8	180.5	45.0	76	
175.6	44.0	176.5	44.2	177.5	44.5	178.5	44.7	179.5	45.0	180.4	45.2	..	$6\frac{3}{4}$
174.8	46.8	175.8	47.1	176.8	47.4	177.7	47.6	178.7	47.9	179.7	48.1	75	
174.0	49.9	174.9	50.2	175.9	50.4	176.9	50.7	177.8	51.0	178.8	51 3	74	
173.2	52.5	174.2	52.8	175 1	53.1	176.1	53.4	177.0	53.7	178.0	54.0	..	$6\frac{1}{2}$
173.1	52.9	174.0	53.2	175 0	53.5	176.0	53.8	176.9	54.1	177.9	54.4	73	
172.1	55.9	173.1	56.2	174.0	56.6	175.0	56.9	175.9	57.2	176.9	57.5	72	
171.1	58.9	172.1	59.3	173.0	59.6	174.0	59 9	174.9	60 2	175.9	60.6	71	
170.4	61.0	171.4	61.3	172.3	61.6	173.2	62.0	174.2	62.3	175.1	62.7	..	$6\frac{1}{4}$
170.1	61.9	171.0	62.2	172.0	62.6	172.9	62.9	173.8	63.3	174.8	63.6	70	
169.0	64.9	169.9	65.2	170.8	65.6	171.8	65 9	172.7	66.3	173.6	66.7	69	
167.8	67.8	168.7	68.2	169.7	68.6	170.6	68.9	171.5	69.3	172.5	69.7	68	
167.2	69.3	168.2	69.7	169.1	70 0	170.0	70.4	170.9	70.8	171.8	71.2	..	6
166.6	70.7	167.5	71.1	168.5	71.5	169.4	71 9	170.3	72.3	171.2	72.7	67	
165.4	73.6	166.3	74.0	167.2	74.4	168.1	74.8	169.0	75.2	169.9	75.7	66	
164.0	76.5	164.9	76.9	165.9	77.3	166.8	77.8	167.7	78.2	168.6	78.6	65	
163.6	77.4	164.5	77.8	165.4	78.3	166.3	78.7	167.2	79.1	168.1	79.5	..	$5\frac{3}{4}$
162.7	79.3	163.6	79.8	164.5	80.2	165.4	80.7	166.3	81.1	167.2	81.5	64	
161.3	82.2	162.2	82.6	163.1	83.1	163.9	83 5	164.8	84.0	165.7	84 4	63	
159.8	85.0	160.7	85.4	161.6	85.9	162.5	86.4	163.3	86.9	164.2	87 3	62	
159.6	85.3	160.5	85.8	161.4	86.3	162.3	86.7	163.2	87.2	164.0	87.7	..	$5\frac{1}{2}$
158.3	87.8	159.2	88.2	160.1	88 7	160.9	89.2	161.8	89.7	162.7	90.2	61	
156.8	90.5	157.6	91.0	158.5	91.5	159.3	92.0	160.2	92.5	161.1	93.0	60	
155.3	93.0	156.1	93.6	157.0	94.1	157.8	94.6	158.7	95.1	159.5	95.6	..	$5\frac{1}{4}$
155.1	93.2	156.0	93.7	156.9	94.3	157.7	94 8	158.6	95.3	159.4	95.8	59	
153.5	95.9	154.3	96.4	155.2	97.0	156.0	97.5	156.9	98.0	157.7	98.6	58	
151.8	98.6	152.6	99.1	153.5	99.7	154.3	100.2	155.2	100.8	156.0	101.3	57	
150.5	100.6	151.3	101.1	152.2	101.7	153.0	102.2	153 8	102.8	154.6	103.3	..	5
150.1	101.2	150.9	101.8	151.7	102.3	152.5	102.9	153.4	103.5	154.2	104.0	56	
148.3	103.8	149.1	104.4	149.9	105.0	150.7	105.5	151.5	106.1	152.4	106.7	55	
146.4	106.4	147.2	107 0	148.1	107.6	148.9	108.2	149.7	108.7	150.5	109.3	54	
145.4	107.8	146.2	108.4	147.0	109.0	147.8	109.6	148.6	110 2	149.4	110.8	..	$4\frac{3}{4}$
144.6	108.9	145.4	109.5	146.2	110.1	146.9	110.7	147.7	111.3	148.5	111.9	53	
142.6	111.4	143.4	112.1	144.2	112.7	145.0	113.3	145.8	113.9	146.6	114.5	52	
140.7	113.9	141.4	114.5	142 2	115.2	143.0	115.8	143.8	116.4	144.5	117.1	51	
139.9	114.8	140.7	115.5	141.5	116.1	142.2	116.7	143 0	117.4	143.8	118.0	..	$4\frac{1}{2}$
138.7	116.3	139.4	117.0	140.2	117.6	141.0	118.3	141.7	118.9	142.5	119.6	50	
136.6	118.7	137.4	119.4	138.1	120.1	138.9	120.7	139.6	121.4	140.4	122.0	49	
134.5	121.1	135.3	121.8	136.0	122.5	136.7	123.1	137.5	123.8	138.2	124.5	48	
134.1	121.5	134.8	122.2	135.6	122.9	136.3	123.6	137.1	124.2	137.8	124.9	..	$4\frac{1}{4}$
132.4	123.4	133.1	124.1	133.8	124.8	134.6	125.5	135.3	126.2	136.0	126.9	47	
130.2	125.7	130.9	126.4	131.6	127.1	132.4	127.8	133.1	128.5	133.8	129.2	46	
128.0	128.0	128.7	128.7	129.4	129.4	130.1	130.1	130.8	130.8	131.5	131.5	45	4
Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
181		182		183		184		185		186		Rumos	

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Rumos Pt.	Gr.	Distancia 187 Lt.	187 Ap.	188 Lt.	188 Ap.	189 Lt.	189 Ap.	190 Lt.	190 Ap.	191 Lt.	191 Ap.	192 Lt.	192 Ap.	Rumos Gr.	Pt.
	1	187.0	3.3	188.0	3.3	189.0	3.3	190.0	3.3	191.0	3.3	192.0	3.4	89	
	2	186.9	6.5	187.9	6 6	188.9	6.6	189.9	6.6	190.9	6.7	191.9	6.7	88	
1/4	..	186.8	9.2	187.8	9.2	188.8	9.3	189.8	9.3	190.8	9.4	191.8	9.4	..	7 3/4
	3	186.7	9.8	187.7	9.8	188.7	9.9	189 7	9.9	190.7	10 0	191.7	10.0	87	
	4	186.5	13.0	187.5	13.1	188.5	13.2	189.5	13.3	190.5	13.3	191.5	13.4	86	
	5	186.3	16.3	187.3	16 4	188.3	16.5	189.3	16.6	190.3	16.6	191.3	16.7	85	
1/2	.	186.1	18.3	187.1	18.4	188.1	18.5	189.1	18.6	190 1	18.7	191.1	18.8	..	7 1/2
	6	186.0	19.5	187.0	19 7	188.0	19.8	189.0	19.9	190.0	20.0	190.9	20.1	84	
	7	185.6	22.8	186.6	22.9	187.6	23.0	188.6	23.2	189.6	23.3	190.6	23.4	83	
	8	185.2	26.0	186.2	26.2	187.2	26.3	188.2	26.4	189.1	26.6	190.1	26.7	82	
3/4	..	185.0	27.4	186.0	27.6	186.9	27.7	187.9	27.9	188.9	28.0	189.9	28.2	..	7 1/4
	9	184.7	29.3	185.7	29.4	186.7	29.6	187 7	29.7	188.6	29.9	189.6	30.0	81	
	10	184.2	32.5	185.1	32.6	186.1	32.8	187 1	33.0	188.1	33.2	189.1	33.3	80	
	11	183.6	35.7	184.5	35.9	185.5	36.1	186.5	36.3	187.5	36.4	188.5	36.6	79	
1	..	183.4	36.5	184.4	36.7	185.4	36.9	186.3	37.1	187.3	37.3	188 3	37.5	..	7
	12	182.9	38.9	183.9	39.1	184.9	39.3	185.8	39.5	186.8	39.7	187.8	39.9	78	
	13	182.2	42.1	183.2	42.3	184.2	42.5	185.1	42.7	186.1	43.0	187.1	43.2	77	
	14	181.4	45.2	182.4	45.5	183.4	45.7	184.4	46.0	185.3	46.2	186.3	46 4	76	
1 1/4	..	181.4	45.4	182.4	45.7	183.3	45.9	184.3	46.2	185.3	46.4	186.2	46.7	..	6 3/4
	15	180.6	48.4	181.6	48.7	182.6	48.9	183.5	49.2	184.5	49.4	185.5	49.7	75	
	16	179.8	51.5	180.7	51.8	181.7	52.1	182.6	52.4	183.6	52.6	184.6	52.9	74	
1 1/2	..	179.0	54.3	179.9	54.6	180.9	54.9	181.8	55.1	182.8	55.4	183.7	55.7	..	6 1/2
	17	178.8	54.7	179.8	55.0	180.7	55.3	181.7	55.6	182.7	55.8	183.6	56.1	73	
	18	177.8	57.8	178.8	58.1	179.7	58.4	180 7	58.7	181.7	59.0	182.6	59.3	72	
	19	176.8	60.9	177.8	61.2	178.7	61.5	179.6	61.9	180.6	62.2	181.5	62.5	71	
1 3/4	..	176.1	63.0	177.0	63.3	177.9	63.7	178 9	64.0	179.8	64.3	180.8	64.7	..	6 1/4
	20	175.7	64.0	176.7	64.3	177.6	64.6	178.5	65.0	179.5	65.3	180.4	65.7	70	
	21	174.6	67.0	175.5	67.4	176.4	67.7	177.4	68.1	178.3	68.4	179.2	68.8	69	
	22	173.4	70.1	174.3	70.4	175.2	70.8	176.2	71.2	177.1	71.5	178.0	71.9	68	
2	..	172.8	71.6	173.9	71.9	174.6	72.3	175.5	72.7	176.5	73.1	177.4	73.5	..	6
	23	172.1	73.1	173.1	73.5	174.0	73.8	174.9	74.2	175.8	74.6	176.7	75.0	67	
	24	170.8	76.1	171.7	76.5	172.7	76.9	173.6	77.3	174.5	77.7	175.4	78.1	66	
	25	169.5	79.0	170.4	79.5	171.3	79.9	172.2	80.3	173.1	80.7	174.0	81.1	65	
2 1/4	..	169.0	80.0	169 9	80.4	170.9	80.8	171.8	81.2	172.7	81.7	173.6	82.1	..	5 3/4
	26	168.1	82.0	169.0	82.4	169.9	82.9	170.8	83.3	171.7	83.7	172.6	84.2	64	
	27	166.6	84.9	167.5	85.4	168.4	85.8	169.3	86 3	170.2	86.7	171.1	87.2	63	
	28	165.1	87.8	166.0	88.3	166.9	88.7	167.8	89.2	168.6	89.7	169.5	90.1	62	
2 1/2	..	164.0	88.1	165.8	88.6	166.7	89.1	167 6	89.6	168.5	90.0	169.3	90.5	..	5 1/2
	29	163.6	90.7	164.4	91.1	165.3	91.6	166.2	92.1	167.1	92 6	167.9	93.1	61	
	30	161.9	93.5	162.8	94.0	163.7	94.5	164.5	95.0	165.4	95.5	166.3	96.0	60	
2 3/4	..	160.4	96.1	161.2	96.6	162.1	97.2	163.0	97.7	163.8	98.2	164.7	98.7	..	5 1/4
	31	160.3	96.3	161.1	96.8	162.0	97.3	162.9	97.9	163.7	98 4	164.6	98.9	59	
	32	158.6	99.1	159.4	99.6	160.3	100.2	161.1	100.7	162.0	101.2	162.8	101.7	58	
	33	156.8	101.8	157.7	102.4	158.5	102.9	159.3	103.5	160.2	104.2	161.0	104 6	57	
3	..	155.5	103.9	156.3	104.4	157.1	105.0	158.0	105.6	158.8	106.1	159.6	106.7	..	5
	34	155.0	104.6	155.9	105.1	156.7	105.7	157.5	106.2	158.3	106.8	159.2	107.4	56	
	35	153.2	107.3	154.0	107.8	154.8	108.4	155.6	109.0	156.5	109.6	157.3	110.1	55	
	36	151.3	109.9	152.1	110.5	152.9	111.1	153.7	111.7	154.5	112.3	155.3	112.9	54	
3 1/4	..	150.2	111.4	151.0	112.0	151.8	112.6	152.6	113.2	153.4	113.8	154.2	114.4	..	4 3/4
	37	149.3	112.5	150.1	113.1	150.9	113.7	151.7	114.3	152.5	114.9	153.3	115.5	53	
	38	147.4	115.1	148.1	115.7	148.9	116.4	149.7	117 0	150.5	117.6	151.3	118.2	52	
3 1/2	39	145.3	117.7	146.1	118.3	146.9	118.9	147.7	119.6	148.4	120.2	149.2	120.8	51	
	..	144.5	118.6	145.3	119.3	146.1	119.9	146.9	120.5	147.6	121.2	148.4	121.8	..	4 1/2
	40	143.3	120.2	144.0	120.8	144.8	121.5	145.5	122.1	146.3	122.8	147.1	123.4	50	
	41	141.1	122.7	141.9	123.3	142.6	124.0	143.4	124.7	144.1	125.3	144.9	126.0	49	
3 3/4	42	139 0	125.1	139.7	125.8	140.5	126.5	141.2	127.1	141.9	127.8	142.7	128.5	48	
	..	138.6	125.6	139.3	126.2	140.0	126.9	140.8	127.6	141.5	128.3	142.3	128.9	..	4 1/4
	43	136.8	127.5	137.5	128.2	138.2	128.9	139.0	129.6	139.7	130.3	140.4	130.9	47	
	44	134.5	129.9	135.2	130 6	136.0	131.3	136.7	132.0	137.4	132.7	138.1	133.4	46	
4	45	132.2	132.2	132.9	132.9	133.6	133.6	134.4	134.4	135.1	135.1	135.8	135.8	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		187		188		189		190		191		192			Rumos

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Rumos Pt.	Gr.	Distancia 193 Lt.	193 Ap.	194 Lt.	194 Ap.	195 Lt.	195 Ap.	196 Lt.	196 Ap.	197 Lt.	197 Ap.	198 Lt.	198 Ap.	Rumos Gr.	Pt.
	1	193.0	3.4	194.0	3.4	195.0	3.4	196.0	3.4	197.0	3.4	198.0	3.5	89	
	2	192.9	6.7	193.9	6.8	194.9	6.8	195.9	6.8	196.9	6.9	197.9	6.9	88	
1/4	..	192.8	9.5	193.8	9.5	194.8	9.6	195.8	9.6	196.8	9.7	197.8	9.7	..	7 3/4
	3	192.7	10.1	193.7	10.2	194.7	10.2	195.7	10.3	196.7	10.3	197.7	10.4	87	
	4	192.5	13.5	193.5	13.5	194.5	13.6	195.5	13.7	196.5	13.7	197.5	13.8	86	
	5	192.3	16.8	193.3	16.9	194.3	17.0	195.3	17.1	196.3	17.2	197.2	17.3	85	
1/2	..	192.1	18.9	193.1	19.0	194.1	19.1	195.1	19.2	196.1	19.3	197.0	19.4	..	7 1/2
	6	191.9	20.2	192.9	20.3	193.9	20.4	194.9	20.5	195.9	20.6	196.9	20.7	84	
	7	191.6	23.5	192.6	23.6	193.5	23.8	194.5	23.9	195.5	24.0	196.5	24.1	83	
	8	191.1	26.9	192.1	27.0	193.1	27.1	194.1	27.3	195.1	27.4	196.1	27.6	82	
3/4	..	190.9	28.3	191.9	28.5	192.1	28.6	193.9	28.8	194.9	28.9	195.9	29.0	..	7 1/4
	9	190.6	30.2	191.6	30.3	192.6	30.5	193.6	30.7	194.6	30.8	195.6	31.0	81	
	10	190.1	33.5	191.1	33.7	192.0	33.9	193.0	34.0	194.0	34.2	195.0	34.4	80	
	11	189.5	36.8	190.4	37.0	191.4	37.2	192.4	37.4	193.4	37.6	194.4	37.8	79	
1	..	189.3	37.7	190.3	37.8	191.2	38.0	192.2	38.2	193.2	38.4	194.2	38.6	..	7
	12	188.8	40.1	189.8	40.3	190.7	40.5	191.7	40.8	192.7	41.0	193.7	41.2	78	
	13	188.1	43.4	189.0	43.6	190.0	43.9	191.0	44.1	192.0	44.3	192.9	44.5	77	
	14	187.3	46.7	188.2	46.9	189.2	47.2	190.2	47.4	191.1	47.7	192.1	47.9	76	
1 1/4	..	187.2	46.9	188.2	47.1	189.2	47.4	190.1	47.6	191.1	47.9	192.1	48.1	..	6 3/4
	15	186.4	50.0	187.4	50.2	188.4	50.5	189.3	50.7	190.3	51.0	191.3	51.2	75	
	16	185.5	53.2	186.5	53.5	187.4	53.7	188.4	54.0	189.4	54.3	190.3	54.6	74	
1 1/2	..	184.7	56.0	185.7	56.3	186.6	56.6	187.6	56.9	188.5	57.2	189.5	57.5	..	6 1/2
	17	184.6	56.4	185.5	56.7	186.5	57.0	187.4	57.3	188.4	57.6	189.3	57.9	73	
	18	183.6	59.6	184.5	59.9	185.5	60.3	186.4	60.6	187.4	60.9	188.3	61.2	72	
	19	182.5	62.8	183.4	63.2	184.4	63.5	185.3	63.8	186.3	64.1	187.2	64.5	71	
1 3/4	..	181.7	65.0	182.7	65.4	183.6	65.7	184.5	66.0	185.5	66.4	186.4	66.7	..	6 1/4
	20	181.4	66.0	182.3	66.4	183.2	66.7	184.2	67.0	185.1	67.4	186.1	67.7	70	
	21	180.2	69.2	181.1	69.5	182.0	69.9	183.0	70.2	183.9	70.6	184.8	71.0	69	
	22	178.9	72.3	179.9	72.7	180.8	73.0	181.7	73.4	182.7	73.8	183.6	74.2	68	
2	..	178.3	73.9	179.2	74.2	180.2	74.6	181.1	75.0	182.0	75.4	182.9	75.8	..	6
	23	177.7	75.4	178.6	75.8	179.5	76.2	180.4	76.6	181.3	77.0	182.3	77.4	67	
	24	176.3	78.5	177.2	78.9	178.1	79.3	179.1	79.7	180.0	80.1	180.9	80.5	66	
	25	174.9	81.6	175.8	82.0	176.7	82.4	177.6	82.8	178.5	83.3	179.4	83.7	65	
2 1/4	..	174.5	82.5	175.4	83.0	176.3	83.4	177.2	83.8	178.1	84.2	179.0	84.7	..	5 3/4
	26	173.5	84.6	174.4	85.0	175.3	85.5	176.2	85.9	177.1	86.4	178.0	86.8	64	
	27	172.0	87.6	172.9	88.1	173.7	88.5	174.6	89.0	175.5	89.4	176.4	89.9	63	
	28	170.4	90.6	171.3	91.1	172.2	91.5	173.1	92.0	173.9	92.5	174.8	93.0	62	
2 1/2	..	170.2	91.0	171.1	91.4	172.0	91.9	172.9	92.4	173.7	92.9	174.6	93.3	..	5 1/2
	29	168.8	93.6	169.7	94.1	170.6	94.5	171.4	95.0	172.3	95.5	173.2	96.0	61	
	30	167.1	96.5	168.0	97.0	168.9	97.5	169.7	98.0	170.6	98.5	171.5	99.0	60	
2 3/4	..	165.5	99.2	166.4	99.7	167.3	100.2	168.1	100.8	169.0	101.3	169.8	101.8	..	5 1/4
	31	165.4	99.4	166.3	99.9	167.1	100.4	168.0	100.9	168.9	101.5	169.7	102.0	59	
	32	163.7	102.3	164.5	102.8	165.4	103.3	166.2	103.9	167.1	104.4	167.9	104.9	58	
	33	161.9	105.1	162.7	105.7	163.5	106.2	164.4	106.7	165.2	107.3	166.1	107.8	57	
3	..	160.5	107.2	161.3	107.8	162.1	108.3	163.0	108.9	163.8	109.4	164.6	110.0	..	5
	34	160.0	107.9	160.8	108.5	161.7	109.0	162.5	109.6	163.3	110.2	164.1	110.7	56	
	35	158.1	110.7	158.9	111.3	159.7	111.8	160.6	112.4	161.4	113.0	162.2	113.6	55	
	36	156.1	113.4	156.9	114.0	157.8	114.6	158.6	115.2	159.4	115.8	160.2	116.4	54	
3 1/4	..	155.0	115.0	155.8	115.6	156.6	116.2	157.4	116.8	158.2	117.4	159.0	118.0	..	4 3/4
	37	154.1	116.2	154.9	116.8	155.7	117.4	156.5	118.0	157.3	118.6	158.1	119.2	53	
	38	152.1	118.8	152.9	119.4	153.7	120.1	154.5	120.7	155.2	121.3	156.0	121.9	52	
	39	150.0	121.5	150.8	122.1	151.5	122.7	152.3	123.3	153.1	124.0	153.9	124.6	51	
3 1/2	..	149.2	122.4	150.0	123.1	150.7	123.7	151.5	124.3	152.3	125.0	153.1	125.6	..	4 1/2
	40	147.8	124.1	148.6	124.7	149.4	125.3	150.1	126.0	150.9	126.6	151.7	127.3	50	
	41	145.7	126.6	146.4	127.3	147.2	127.9	147.9	128.6	148.7	129.2	149.4	129.9	49	
	42	143.4	129.1	144.2	129.8	144.9	130.5	145.7	131.1	146.4	131.8	147.1	132.5	48	
3 3/4	..	143.0	129.6	143.7	130.3	144.5	130.9	145.2	131.6	146.0	132.3	146.7	133.0	..	4 1/4
	43	141.2	131.6	141.9	132.3	142.6	133.0	143.3	133.7	144.1	134.4	144.8	135.0	47	
	44	138.8	134.1	139.6	134.8	140.3	135.5	141.0	136.2	141.7	136.8	142.4	137.5	46	
4	45	136.5	136.5	137.2	137.2	137.9	137.9	138.6	138.6	139.3	139.3	140.0	140.0	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		193		194		195		196		197		198		Rumos	

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Rumos Pt.	Gr.	Distancia 199 Lt.	199 Ap.	200 Lt.	200 Ap.	201 Lt.	201 Ap.	202 Lt.	202 Ap.	203 Lt.	203 Ap.	204 Lt.	204 Ap.	Gr.	Rumos Pt.
	1	199.0	3.5	200.0	3.5	201.0	3.5	202.0	3.5	203.0	3.5	204.0	3.6	89	
$\frac{1}{4}$	2	198.9	6.9	199.9	7.0	200.9	7.0	201.9	7.0	202.9	7.1	203.9	7.1	88	
	..	198.8	9.8	199.8	9.8	200.8	9.9	201.8	9.9	202.8	10.0	203.8	10.0	..	$7\frac{3}{4}$
	3	198.7	10.4	199.7	10.5	200.7	10.5	201.7	10.6	202.7	10.6	203.7	10.7	87	
	4	198.5	13.9	199.5	14.0	200.5	14.0	201.5	14.1	202.5	14.2	203.5	14.2	86	
	5	198.2	17.3	199.2	17.4	200.2	17.5	201.2	17.6	202.2	17.7	203.2	17.8	85	
$\frac{1}{2}$	.	198.0	19.5	199.0	19.6	200.0	19.7	201.0	19.8	202.0	19.9	203.0	20.0	..	$7\frac{1}{2}$
	6	197.9	20.8	198.9	20.9	199.9	21.0	200.9	21.1	201.9	21.2	202.9	21.3	84	
	7	197.5	24.3	198.5	24.4	199.5	24.5	200.5	24.6	201.5	24.7	202.5	24.9	83	
	8	197.1	27.7	198.1	27.8	199.0	28.0	200.0	28.1	201.0	28.3	202.0	28.4	82	
$\frac{3}{4}$	..	196.8	29.2	197.8	29.3	198.8	29.5	199.8	29.6	200.8	29.8	201.8	29.9	..	$7\frac{1}{4}$
	9	196.5	31.1	197.5	31.3	198.5	31.4	199.5	31.6	200.5	31.8	201.5	31.9	81	
	10	196.0	34.6	197.0	34.7	197.9	34.9	198.9	35.1	199.9	35.3	200.9	35.4	80	
	11	195.3	38.0	196.3	38.2	197.3	38.4	198.3	38.5	199.3	38.7	200.3	38.9	79	
1	..	195.2	38.8	196.2	39.0	197.1	39.2	198.1	39.4	199.1	39.6	200.1	39.8	..	7
	12	194.7	41.4	195.6	41.6	196.6	41.8	197.6	42.0	198.6	42.2	199.5	42.4	78	
	13	193.9	44.8	194.9	45.0	195.8	45.2	196.8	45.4	197.8	45.7	198.8	45.9	77	
	14	193.1	48.1	194.1	48.4	195.0	48.6	196.0	48.9	197.0	49.1	197.9	49.4	76	
$1\frac{1}{4}$	..	193.0	48.4	194.0	48.6	195.0	48.8	195.9	49.1	196.9	49.3	197.9	49.6	..	$6\frac{3}{4}$
	15	192.2	51.5	193.2	51.8	194.2	52.0	195.1	52.3	196.1	52.5	197.0	52.8	75	
	16	191.3	54.9	192.3	55.1	193.2	55.4	194.2	55.7	195.1	56.0	196.1	56.2	74	
$1\frac{1}{2}$	..	190.4	57.8	191.4	58.1	192.3	58.4	193.3	58.6	194.3	58.9	195.2	59.2	..	$6\frac{1}{2}$
	17	190.3	58.2	191.3	58.5	192.2	58.8	193.2	59.1	194.1	59.4	195.1	59.6	73	
	18	189.3	61.5	190.2	61.8	191.2	62.1	192.1	62.4	193.1	62.7	194.0	63.0	72	
	19	188.2	64.8	189.1	65.1	190.0	65.4	191.0	65.8	191.9	66.1	192.9	66.4	71	
$1\frac{3}{4}$	..	187.4	67.0	188.3	67.4	189.2	67.7	190.2	68.0	191.1	68.4	192.1	68.7	..	$6\frac{1}{4}$
	20	187.0	68.1	187.9	68.4	188.9	68.7	189.8	69.1	190.8	69.4	191.7	69.8	70	
	21	185.8	71.3	186.7	71.7	187.6	72.0	188.6	72.4	189.5	72.7	190.5	73.1	69	
	22	184.5	74.5	185.4	74.9	186.4	75.3	187.3	75.7	188.2	76.0	189.1	76.4	68	
2	..	183.9	76.2	184.8	76.5	185.7	76.9	186.6	77.3	187.6	77.7	188.5	78.1	..	6
	23	183.2	77.8	184.1	78.1	185.0	78.5	185.9	78.9	186.9	79.3	187.8	79.7	67	
	24	181.8	80.9	182.7	81.3	183.6	81.8	184.5	82.2	185.4	82.6	186.4	83.0	66	
	25	180.4	84.1	181.3	84.5	182.2	84.9	183.1	85.4	184.0	85.8	184.9	86.2	65	
$2\frac{1}{4}$	..	179.9	85.1	180.8	85.5	181.7	85.9	182.6	86.4	183.5	86.8	184.4	87.2	..	$5\frac{3}{4}$
	26	178.9	87.2	179.8	87.7	180.7	88.1	181.6	88.6	182.5	89.0	183.4	89.4	64	
	27	177.3	90.3	178.2	90.8	179.1	91.3	180.0	91.7	180.9	92.2	181.8	92.6	63	
	28	175.7	93.4	176.6	93.9	177.5	94.4	178.4	94.8	179.2	95.3	180.1	95.8	62	
$2\frac{1}{2}$	..	175.5	93.8	176.4	94.3	177.3	94.7	178.2	95.2	179.0	95.7	179.9	96.2	..	$5\frac{1}{2}$
	29	174.0	96.5	174.9	97.0	175.8	97.4	176.7	97.9	177.5	98.4	178.4	98.9	61	
	30	172.3	99.5	173.2	100.0	174.1	100.5	174.9	101.0	175.8	101.5	176.7	102.0	60	
$2\frac{3}{4}$	..	170.7	102.3	171.5	102.8	172.4	103.3	173.3	103.8	174.1	104.4	175.0	104.9	..	$5\frac{1}{4}$
	31	170.6	102.5	171.4	103.0	172.3	103.5	173.1	104.0	174.0	104.6	174.9	105.1	59	
	32	168.8	105.5	169.6	106.0	170.5	106.5	171.3	107.0	172.2	107.6	173.0	108.1	58	
	33	166.9	108.4	167.7	108.9	168.6	109.5	169.4	110.0	170.3	110.6	171.1	111.1	57	
3	..	165.5	110.6	166.3	111.1	167.1	111.7	168.0	112.2	168.8	112.8	169.6	113.3	..	5
	34	165.0	111.3	165.8	111.8	166.6	112.4	167.5	113.0	168.3	113.5	169.1	114.1	56	
	35	163.0	114.1	163.8	114.7	164.6	115.3	165.5	115.9	166.3	116.4	167.1	117.0	55	
	36	161.0	117.0	161.8	117.6	162.6	118.1	163.4	118.7	164.2	119.3	165.0	119.9	54	
$3\frac{1}{4}$	..	159.8	118.5	160.6	119.1	161.4	119.7	162.2	120.3	163.0	120.9	163.9	121.5	..	$4\frac{3}{4}$
	37	158.9	119.8	159.7	120.4	160.5	121.0	161.3	121.6	162.1	122.2	162.9	122.8	53	
	38	156.8	122.5	157.6	123.1	158.4	123.7	159.2	124.4	160.0	125.0	160.8	125.6	52	
	39	154.7	125.2	155.4	125.9	156.2	126.5	157.0	127.1	157.8	127.8	158.5	128.4	51	
$3\frac{1}{2}$	..	153.8	126.2	154.6	126.9	155.4	127.5	156.1	128.1	156.9	128.8	157.7	129.4	..	$4\frac{1}{2}$
	40	152.4	127.9	153.2	128.6	154.0	129.2	154.7	129.8	155.5	130.5	156.3	131.1	50	
	41	150.2	130.6	150.9	131.2	151.7	131.9	152.5	132.5	153.2	133.2	154.0	133.8	49	
	42	147.9	133.2	148.6	133.8	149.4	134.5	150.1	135.2	150.9	135.8	151.6	136.5	48	
$3\frac{3}{4}$	..	147.4	133.6	148.2	134.3	148.9	135.0	149.7	135.6	150.4	136.3	151.1	137.0	..	$4\frac{1}{4}$
	43	145.5	135.7	146.3	136.4	147.0	137.1	147.7	137.8	148.5	138.4	149.2	139.1	47	
	44	143.1	138.2	143.9	138.9	144.6	139.6	145.3	140.3	146.0	141.0	146.7	141.7	46	
4	45	140.7	140.7	141.4	141.4	142.1	142.1	142.8	142.8	143.5	143.5	144.2	144.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		199		200		201		202		203		204			Rumos

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Rumos Pt.	Gr.	Distancia 205 Lt.	205 Ap.	206 Lt.	206 Ap.	207 Lt.	207 Ap.	208 Lt.	208 Ap.	209 Lt.	209 Ap.	210 Lt.	210 Ap.	Rumos Gr.	Pt.
	1	205.0	3.6	206.0	3.6	207.0	3.6	208.0	3.6	209.0	3.6	210.0	3.7	89	
	2	204.9	7.2	205.9	7.2	206.9	7.2	207.9	7.3	208.9	7.3	209.9	7.3	88	
1/4	..	204.8	10.1	205.8	10.1	206.8	10.2	207.8	10.2	208.8	10.3	209.8	10.3	..	7 3/4
	3	204.7	10.7	205.7	10.8	206.7	10.8	207.7	10.9	208.7	10.9	209.7	11.0	87	
	4	204.5	14.3	205.5	14.4	206.5	14.4	207.5	14.5	208.5	14.6	209.5	14.6	86	
	5	204.2	17.9	205.2	18.0	206.2	18.0	207.2	18.1	208.2	18.2	209.2	18.3	85	
1/2	..	204.0	20.1	205.0	20.2	206.0	20.3	207.0	20.4	208.0	20.5	209.0	20.6	..	7 1/2
	6	203.9	21.4	204.9	21.5	205.9	21.6	206.9	21.7	207.9	21.8	208.8	22.0	84	
	7	203.5	25.0	204.5	25.1	205.5	25.2	206.4	25.3	207.4	25.5	208.4	25.6	83	
	8	203.0	28.5	204.0	28.7	205.0	28.8	206.0	28.9	207.0	29.1	208.0	29.2	82	
3/4	..	202.8	30.1	203.8	30.2	204.8	30.4	205.7	30.5	206.7	30.7	207.7	30.8	..	7 1/4
	9	202.5	32.1	203.5	32.2	204.5	32.4	205.4	32.5	206.4	32.7	207.4	32.9	81	
	10	201.9	35.6	202.9	35.8	203.9	35.9	204.8	36.1	205.8	36.3	206.8	36.5	80	
	11	201.2	39.1	202.2	39.3	203.2	39.5	204.2	39.7	205.2	39.9	206.1	40.1	79	
1	..	201.1	40.0	202.0	40.2	203.0	40.4	204.0	40.6	205.0	40.8	206.0	41.0	..	7
	12	200.5	42.6	201.5	42.8	202.5	43.0	203.5	43.2	204.4	43.5	205.4	43.7	78	
	13	199.7	46.1	200.7	46.3	201.7	46.6	202.7	46.8	203.6	47.0	204.6	47.2	77	
	14	198.9	49.6	199.9	49.8	200.9	50.1	201.8	50.3	202.8	50.6	203.8	50.8	76	
1 1/4	..	198.9	49.8	199.8	50.1	200.8	50.3	201.8	50.5	202.7	50.8	203.7	51.0	..	6 3/4
	15	198.0	53.1	199.0	53.3	199.9	53.6	200.9	53.8	201.9	54.1	202.8	54.4	75	
	16	197.1	56.5	198.0	56.8	199.0	57.1	199.9	57.3	200.9	57.6	201.9	57.9	74	
1 1/2	..	196.2	59.5	197.1	59.8	198.1	60.1	199.0	60.4	200.0	60.7	201.0	61.0	..	6 1/2
	17	196.0	59.9	197.0	60.2	198.0	60.5	198.9	60.8	199.9	61.1	200.8	61.4	73	
	18	195.0	63.3	195.9	63.7	196.9	64.0	197.8	64.3	198.8	64.6	199.7	64.9	72	
	19	193.8	66.7	194.8	67.1	195.7	67.4	196.7	67.7	197.6	68.0	198.6	68.4	71	
1 3/4	..	193.0	69.1	194.0	69.4	194.9	69.7	195.8	70.1	196.8	70.4	197.7	70.7	..	6 1/4
	20	192.6	70.1	193.6	70.5	194.5	70.8	195.5	71.1	196.4	71.5	197.3	71.8	70	
	21	191.4	73.5	192.3	73.8	193.3	74.2	194.2	74.5	195.1	74.9	196.1	75.3	69	
	22	190.1	76.8	191.0	77.2	191.9	77.5	192.9	77.9	193.8	78.3	194.7	78.7	68	
2	..	189.4	78.5	190.3	78.8	191.2	79.2	192.2	79.6	193.1	80.0	194.0	80.4	..	6
	23	188.7	80.1	189.6	80.5	190.5	80.9	191.5	81.3	192.4	81.7	193.3	82.1	67	
	24	187.3	83.4	188.2	83.8	189.1	84.2	190.0	84.6	190.9	85.0	191.8	85.4	66	
	25	185.8	86.6	186.7	87.1	187.6	87.5	188.5	87.9	189.4	88.3	190.3	88.7	65	
2 1/4	..	185.3	87.7	186.2	88.1	187.1	88.5	188.0	88.9	188.9	89.4	189.8	89.8	..	5 3/4
	26	184.3	89.9	185.2	90.3	186.1	90.7	186.9	91.2	187.8	91.6	188.7	92.1	64	
	27	182.7	93.1	183.5	93.5	184.4	94.0	185.3	94.4	186.2	94.9	187.1	95.3	63	
	28	181.0	96.2	181.9	96.7	182.8	97.2	183.7	97.7	184.5	98.1	185.4	98.6	62	
2 1/2	..	180.8	96.6	181.7	97.1	182.6	97.6	183.4	98.0	184.3	98.5	185.2	99.0	..	5 1/2
	29	179.3	99.4	180.2	99.9	181.0	100.4	181.9	100.8	182.8	101.3	183.7	101.8	61	
	30	177.5	102.5	178.4	103.0	179.3	103.5	180.1	104.0	181.0	104.5	181.9	105.0	60	
2 3/4	..	175.8	105.4	176.7	105.9	177.5	106.4	178.4	106.9	179.2	107.4	180.1	108.0	..	5 1/4
	31	175.7	105.6	176.6	106.1	177.4	106.6	178.3	107.1	179.1	107.6	180.0	108.2	59	
	32	173.8	108.6	174.7	109.2	175.5	109.7	176.4	110.2	177.2	110.8	178.1	111.3	58	
	33	171.9	111.7	172.8	112.2	173.6	112.7	174.4	113.3	175.3	113.8	176.1	114.4	57	
3	..	170.4	113.9	171.3	114.4	172.1	115.0	172.9	115.6	173.8	116.1	174.6	116.7	..	5
	34	170.0	114.6	170.8	115.2	171.6	115.8	172.4	116.3	173.3	116.9	174.1	117.4	56	
	35	167.9	117.6	168.7	118.2	169.6	118.7	170.4	119.3	171.2	119.9	172.0	120.5	55	
	36	165.8	120.5	166.7	121.1	167.5	121.7	168.3	122.3	169.1	122.8	169.9	123.4	54	
3 1/4	..	164.7	122.1	165.5	122.7	166.3	123.3	167.1	123.9	167.9	124.5	168.7	125.1	..	4 3/4
	37	163.7	123.4	164.5	124.0	165.3	124.6	166.1	125.2	166.9	125.8	167.7	126.4	53	
	38	161.5	126.2	162.3	126.8	163.1	127.4	163.9	128.1	164.7	128.7	165.5	129.3	52	
	39	159.3	129.0	160.1	129.6	160.9	130.3	161.6	130.9	162.4	131.5	163.2	132.2	51	
3 1/2	..	158.5	130.0	159.2	130.7	160.0	131.3	160.8	132.0	161.6	132.6	162.3	133.2	..	4 1/2
	40	157.0	131.8	157.8	132.4	158.6	133.1	159.3	133.7	160.1	134.3	160.9	135.0	50	
	41	154.7	134.5	155.5	135.1	156.2	135.8	157.0	136.5	157.7	137.1	158.5	137.8	49	
	42	152.3	137.2	153.1	137.8	153.8	138.5	154.6	139.2	155.3	139.8	156.1	140.5	48	
3 3/4	..	151.9	137.7	152.6	138.3	153.4	139.0	154.1	139.7	154.9	140.3	155.6	141.0	..	4 1/4
	43	149.9	139.8	150.7	140.5	151.4	141.2	152.1	141.9	152.9	142.5	153.6	143.2	47	
	44	147.5	142.4	148.2	143.1	148.9	143.8	149.6	144.5	150.3	145.2	151.1	145.9	46	
4	45	145.0	145.0	145.7	145.7	146.4	146.4	147.1	147.1	147.8	147.8	148.5	148.5	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		205		206		207		208		209		210			Rumos

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Rumos Pt.	Gr.	Distancia 211 Lt.	211 Ap.	212 Lt.	212 Ap.	213 Lt.	213 Ap.	214 Lt.	214 Ap.	215 Lt.	215 Ap.	216 Lt.	216 Ap.	Rumos Gr.	Pt.
	1	211.0	3.7	212.0	3.7	213.0	3.7	214.0	3.7	215.0	3.8	216.0	3.8	89	
	2	210.9	7.4	211.9	7.4	212.9	7.4	213.9	7.5	214.9	7.5	215.9	7.5	88	
$\frac{1}{4}$	..	210.7	10.4	211.7	10.4	212.7	10.5	213.7	10.5	214.7	10.6	215.7	10.6	..	$7\frac{3}{4}$
	3	210.7	11.0	211.7	11.1	212.7	11.1	213.7	11.2	214.7	11.3	215.7	11.3	87	
	4	210.5	14.7	211.5	14.8	212.5	14.9	213.5	14.9	214.5	15.0	215.5	15.1	86	
	5	210.2	18.4	211.2	18.5	212.2	18.6	213.2	18.7	214.2	18.7	215.2	18.8	85	
$\frac{1}{2}$	..	210.0	20.7	211.0	20.8	212.0	20.9	213.0	21.0	214.0	21.1	215.0	21.2	..	$7\frac{1}{2}$
	6	209.8	22.1	210.8	22.2	211.8	22.3	212.8	22.4	213.8	22.5	214.8	22.6	84	
	7	209.4	25.7	210.4	25.8	211.4	26.0	212.4	26.1	213.4	26.2	214.4	26.3	83	
	8	208.9	29.4	209.9	29.5	210.9	29.6	211.9	29.8	212.9	29.2	213.9	30.1	82	
$\frac{3}{4}$	..	208.7	30.9	209.7	31.1	210.7	31.2	211.7	31.4	212.7	31.5	213.7	31.7	..	$7\frac{1}{4}$
	9	208.4	33.0	209.4	33.2	210.4	33.3	211.4	33.5	212.4	33.6	213.3	33.8	81	
	10	207.8	36.6	208.8	36.8	209.8	37.0	210.7	37.2	211.7	37.3	212.7	37.5	80	
	11	207.1	40.3	208.1	40.5	209.1	40.6	210.1	40.8	211.0	41.0	212.0	41.2	79	
1	..	206.9	41.2	207.9	41.4	208.9	41.6	209.9	41.7	210.9	41.9	211.8	42.1	..	7
	12	206.4	43.9	207.4	44.1	208.3	44.3	209.3	44.5	210.3	44.7	211.3	44.9	78	
	13	205.6	47.5	206.1	47.7	207.5	47.9	208.5	48.1	209.5	48.4	210.5	48.6	77	
	14	204.7	51.0	205.7	51.3	206.7	51.5	207.6	51.8	208.6	52.0	209.6	52.3	76	
$1\frac{1}{4}$	..	204.7	51.3	205.6	51.5	206.6	51.8	207.6	52.0	208.6	52.2	209.5	52.5	..	$6\frac{3}{4}$
	15	203.8	54.6	204.8	54.9	205.7	55.1	206.7	55.4	207.7	55.6	208.6	55.9	75	
	16	202.8	58.2	203.8	58.4	204.7	58.7	205.7	59.0	206.7	59.3	207.6	59.5	74	
$1\frac{1}{2}$	..	201.9	61.2	202.9	61.5	203.8	61.8	204.8	62.1	205.7	62.4	206.7	62.7	..	$6\frac{1}{2}$
	17	201.8	61.7	202.7	62.0	203.7	62.3	204.6	62.6	205.6	62.9	206.6	63.2	73	
	18	200.7	65.2	201.6	65.5	202.6	65.8	203.5	66.1	204.5	66.4	205.4	66.7	72	
	19	199.5	68.7	200.4	69.0	201.4	69.3	202.3	69.7	203.3	70.0	204.2	70.3	71	
$1\frac{3}{4}$	..	198.7	71.1	199.6	71.4	200.5	71.8	201.5	72.1	202.4	72.4	203.4	72.8	..	$6\frac{1}{4}$
	20	198.3	72.2	199.2	72.5	200.2	72.9	201.1	73.2	202.0	73.5	203.0	73.9	70	
	21	197.0	75.6	197.9	76.0	198.9	76.3	199.8	76.7	200.7	77.0	201.7	77.4	69	
	22	195.6	79.0	196.6	79.4	197.5	79.8	198.4	80.2	199.3	80.5	200.3	80.9	68	
2	..	194.9	80.8	195.9	81.1	196.8	81.5	197.7	81.9	198.6	82.3	199.6	82.7	..	6
	23	194.2	82.4	195.1	82.8	196.1	83.2	197.0	83.6	197.9	84.0	198.8	84.4	67	
	24	192.8	85.8	193.7	86.2	194.6	86.6	195.5	87.0	196.4	87.4	197.3	87.9	66	
	25	191.2	89.2	192.1	89.6	193.0	90.0	193.9	90.4	194.9	90.9	195.8	91.3	65	
$2\frac{1}{4}$	..	190.7	90.2	191.6	90.6	192.6	91.1	193.5	91.5	194.4	91.9	195.3	92.4	..	$5\frac{3}{4}$
	26	189.6	92.5	190.5	92.9	191.4	93.4	192.3	93.8	193.2	94.2	194.1	94.7	64	
	27	188.0	95.8	188.9	96.2	189.8	96.7	190.7	97.2	191.6	97.6	192.5	98.1	63	
	28	186.3	99.1	187.2	99.5	188.1	100.0	189.0	100.5	189.8	100.9	190.7	101.4	62	
$2\frac{1}{2}$	..	186.1	99.5	187.0	99.9	187.8	100.4	188.7	100.9	189.6	101.3	190.5	101.8	..	$5\frac{1}{2}$
	29	184.5	102.3	185.4	102.8	186.3	103.3	187.2	103.7	188.0	104.2	188.9	104.7	61	
	30	182.7	105.5	183.6	106.0	184.5	106.5	185.3	107.0	186.2	107.5	187.1	108.0	60	
$2\frac{3}{4}$	..	181.0	108.5	181.8	109.0	182.7	109.5	183.5	110.0	184.4	110.5	185.3	111.0	..	$5\frac{1}{4}$
	31	180.9	108.7	181.7	109.2	182.6	109.7	183.4	110.2	184.3	110.7	185.1	111.2	59	
	32	178.9	111.8	179.8	112.3	180.6	112.9	181.5	113.4	182.3	113.9	183.2	114.5	58	
	33	177.0	114.9	177.8	115.5	178.6	116.0	179.5	116.6	180.3	117.1	181.2	117.6	57	
3	..	175.4	117.2	176.3	117.8	177.1	118.3	177.9	118.9	178.8	119.4	179.6	120.0	..	5
	34	174.9	118.0	175.8	118.5	176.6	119.1	177.4	119.7	178.2	120.2	179.1	120.8	56	
	35	172.8	121.0	173.7	121.6	174.5	122.2	175.3	122.7	176.1	123.3	176.9	123.9	55	
	36	170.7	124.0	171.5	124.6	172.3	125.2	173.1	125.8	173.9	126.4	174.7	127.0	54	
$3\frac{1}{4}$	..	169.5	125.7	170.3	126.3	171.1	126.9	171.9	127.5	172.7	128.1	173.5	128.7	..	$4\frac{3}{4}$
	37	168.5	127.0	169.3	127.6	170.1	128.2	170.9	128.8	171.7	129.4	172.5	130.0	53	
	38	166.3	129.9	167.1	130.5	167.8	131.1	168.6	131.8	169.4	132.4	170.2	133.0	52	
	39	164.0	132.8	164.8	133.4	165.5	134.0	166.3	134.7	167.1	135.3	167.9	135.9	51	
$3\frac{1}{2}$	..	163.1	133.9	163.9	134.5	164.6	135.1	165.4	135.8	166.2	136.4	167.0	137.0	..	$4\frac{1}{2}$
	40	161.6	135.6	162.4	136.3	163.2	136.9	163.9	137.6	164.7	138.2	165.5	138.8	50	
	41	159.2	138.4	160.0	139.1	160.8	139.7	161.5	140.4	162.3	141.1	163.0	141.7	49	
	42	156.8	141.2	157.5	141.9	158.3	142.5	159.0	143.2	159.8	143.9	160.5	144.5	48	
$3\frac{3}{4}$	..	156.3	141.7	157.1	142.4	157.8	143.0	158.6	143.7	159.3	144.4	160.0	145.0	..	$4\frac{1}{4}$
	43	154.3	143.7	155.0	144.6	155.8	145.3	156.5	145.9	157.2	146.6	158.0	147.3	47	
	44	151.8	146.6	152.5	147.3	153.2	148.0	153.9	148.7	154.7	149.4	155.4	150.0	46	
4	45	149.2	149.2	149.9	149.9	150.6	150.6	151.3	151.3	152.0	152.0	152.7	152.7	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		211		212		213		214		215		216			Rumos

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Rumos Pt.	Gr.	Distancia 217 Lt.	217 Ap.	218 Lt.	218 Ap.	219 Lt.	219 Ap.	220 Lt.	220 Ap.	221 Lt.	221 Ap.	222 Lt.	222 Ap.	Rumos Gr.	Pt.
	1	217.0	3.8	218.0	3.8	219.0	3.8	220.0	3.8	221.0	3.9	222.0	3.9	89	
	2	216.9	7.6	217.9	7.6	218.9	7.6	219.9	7.7	220.9	7.7	221.9	7.7	88	
1/4	..	216.7	10.7	217.7	10.7	218.7	10.8	219.7	10.8	220.7	10.8	221.7	10.9	..	7 3/4
	3	216.7	11.4	217.7	11.4	218.7	11.5	219.7	11.5	220.7	11.6	221.7	11.0	87	
	4	216.5	15.1	217.5	15.2	218.5	15.3	219.5	15.3	220.5	15.4	221.5	15.5	86	
	5	216.2	18.9	217.2	19.0	218.2	19.1	219.2	19.2	220.2	19.3	221.2	19.3	85	
1/2	..	216.0	21.3	216.9	21.4	217.9	21.5	218.9	21.6	219.9	21.7	220.9	21.8	..	7 1/2
	6	215.8	22.7	216.8	22.8	217.8	22.9	218.8	23.0	219.8	23.1	220.8	23.2	84	
	7	215.4	26.4	216.4	26.6	217.4	26.7	218.4	26.8	219.4	26.9	220.3	27.1	83	
	8	214.9	30.2	215.9	30.3	216.9	30.5	217.9	30.6	218.8	30.8	219.8	30.9	82	
3/4	..	214.6	31.8	215.6	32.0	216.6	32.1	217.6	32.3	218.6	32.4	219.6	32.6	..	7 1/4
	9	214.3	33.9	215.3	34.1	216.3	34.3	217.3	34.4	218.3	34.6	219.3	34.7	81	
	10	213.7	37.7	214.7	37.9	215.7	38.0	216.7	38.2	217.6	38.4	218.6	38.5	80	
	11	213.0	41.4	214.0	41.6	215.0	41.8	216.0	42.0	216.9	42.2	217.9	42.4	79	
1	..	212.8	42.3	213.8	42.5	214.8	42.7	215.8	42.9	216.7	43.1	217.7	43.3	..	7
	12	212.3	45.1	213.2	45.3	214.2	45.5	215.2	45.7	216.2	45.9	217.1	46.2	78	
	13	211.4	48.8	212.4	49.0	213.4	49.3	214.4	49.5	215.3	49.7	216.3	49.9	77	
	14	210.6	52.5	211.5	52.7	212.5	53.0	213.5	53.2	214.4	53.5	215.4	53.7	76	
1 1/4	..	210.5	52.7	211.5	53.0	212.4	53.2	213.4	53.5	214.4	53.7	215.4	53.9	..	6 3/4
	15	209.6	56.2	210.6	56.4	211.5	56.7	212.5	56.9	213.5	57.2	214.4	57.5	75	
	16	208.6	59.8	209.6	60.1	210.5	60.4	211.5	60.6	212.4	60.9	213.4	61.2	74	
1 1/2	..	207.7	63.0	208.6	63.3	209.6	63.6	210.5	63.9	211.5	64.1	212.4	64.4	..	6 1/2
	17	207.5	63.4	208.5	63.7	209.4	64.0	210.4	64.3	211.3	64.6	212.3	64.9	73	
	18	206.4	67.1	207.3	67.4	208.3	67.7	209.2	68.0	210.2	68.3	211.1	68.6	72	
	19	205.2	70.6	206.1	71.0	207.1	71.3	208.0	71.6	209.0	72.0	209.9	72.3	71	
1 3/4	..	204.3	73.1	205.3	73.4	206.2	73.8	207.1	74.1	208.1	74.4	209.0	74.8	..	6 1/4
	20	203.9	74.2	204.9	74.6	205.8	74.9	206.7	75.2	207.7	75.6	208.6	75.9	70	
	21	202.6	77.8	203.5	78.1	204.5	78.5	205.4	78.8	206.3	79.2	207.3	79.6	69	
	22	201.2	81.3	202.1	81.7	203.1	82.0	204.0	82.4	204.9	82.8	205.8	83.2	68	
2	..	200.5	83.0	201.4	83.4	202.3	83.8	203.3	84.2	204.2	84.6	205.1	85.0	.	6
	23	199.7	84.8	200.7	85.2	201.6	85.6	202.5	86.0	203.4	86.4	204.4	86.7	67	
	24	198.2	88.3	199.2	88.7	200.1	89.1	201.0	89.5	201.9	89.9	202.8	90.3	66	
	25	196.7	91.7	197.6	92.1	198.5	92.6	199.4	93.0	200.3	93.4	201.2	93.8	65	
2 1/4	..	196.2	92.8	197.1	93.2	198.0	93.6	198.9	94.1	199.8	94.5	200.7	94.9	..	5 3/4
	26	195.0	95.1	195.9	95.6	196.8	96.0	197.7	96.4	198.6	96.9	199.5	97.3	64	
	27	193.3	98.5	194.2	99.0	195.1	99.4	196.0	99.9	196.9	100.3	197.8	100.8	63	
	28	191.6	101.9	192.5	102.3	193.4	102.8	194.2	103.3	195.1	103.8	196.0	104.2	62	
2 1/2	..	191.4	102.3	192.3	102.8	193.1	103.2	194.0	103.7	194.9	104.2	195.8	104.6	..	5 1/2
	29	189.8	105.2	190.7	105.7	191.5	106.2	192.4	106.7	193.3	107.1	194.2	107.6	61	
	30	187.9	108.5	188.8	109.0	189.7	109.5	190.5	110.0	191.4	110.5	192.3	111.0	60	
2 3/4	..	186.1	111.6	187.0	112.1	187.8	112.6	188.7	113.1	189.6	113.6	190.4	114.1	..	5 1/4
	31	186.0	111.8	186.9	112.3	187.7	112.8	188.6	113.3	189.4	113.8	190.3	114.3	59	
	32	184.0	115.0	184.9	115.5	185.7	116.1	186.6	116.6	187.4	117.1	188.3	117.6	58	
	33	182.0	118.2	182.8	118.7	183.7	119.3	184.5	119.8	185.3	120.4	186.2	120.9	57	
3	..	180.4	120.6	181.3	121.1	182.1	121.7	182.9	122.2	183.7	122.8	184.6	123.3	..	5
	34	179.9	121.3	180.7	121.9	181.6	122.5	182.4	123.0	183.2	123.6	184.0	124.1	56	
	35	177.8	124.5	178.6	125.0	179.4	125.6	180.2	126.2	181.0	126.8	181.9	127.3	55	
	36	175.6	127.5	176.4	128.1	177.2	128.7	178.0	129.3	178.8	129.9	179.6	130.5	54	
3 1/4	..	174.3	129.3	175.1	129.9	175.9	130.5	176.7	131.1	177.5	131.7	178.3	132.2	..	4 3/4
	37	173.3	130.6	174.1	131.2	174.9	131.8	175.7	132.4	176.5	133.0	177.3	133.6	53	
	38	171.0	133.6	171.8	134.2	172.6	134.8	173.4	135.4	174.2	136.1	174.9	136.7	52	
	39	168.6	136.6	169.4	137.2	170.2	137.8	171.0	138.5	171.7	139.1	172.5	139.7	51	
3 1/2	..	167.7	137.7	168.5	138.3	169.3	138.9	170.1	139.6	170.8	140.2	171.6	140.8	..	4 1/2
	40	166.2	139.5	167.0	140.1	167.8	140.8	168.5	141.4	169.3	142.1	170.1	142.7	50	
	41	163.8	142.4	164.5	143.0	165.3	143.7	166.0	144.3	166.8	145.0	167.5	145.6	49	
	42	161.3	145.2	162.0	145.9	162.7	146.5	163.5	147.2	164.2	147.9	165.0	148.5	48	
3 3/4	..	160.8	145.7	161.5	146.4	162.3	147.1	163.0	147.7	163.7	148.4	164.5	149.1	..	4 1/4
	43	158.7	148.0	159.4	148.7	160.2	149.4	160.9	150.0	161.6	150.7	162.4	151.4	47	
	44	156.1	150.7	156.8	151.4	157.5	152.1	158.3	152.8	159.6	153.5	159.7	154.2	46	
4	45	153.4	153.4	154.1	154.1	154.9	154.9	155.6	155.6	156.3	156.3	157.0	157.0	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		217		218		219		220		221		222		Rumos	

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Rumos Pt.	Rumos Gr.	Distancia 223 Lt.	223 Ap.	224 Lt.	224 Ap.	225 Lt.	225 Ap.	226 Lt.	226 Ap.	227 Lt.	227 Ap.	228 Lt.	228 Ap.	Rumos Gr.	Rumos Pt.
	1	223.0	3.9	224.0	3.9	225.0	3.9	226.0	3.9	227.0	4.0	228.0	4.0	89	
	2	222.9	7.8	223.9	7.8	224.9	7.9	225.9	7.9	226.9	7.9	227.9	8.0	88	
$\frac{1}{4}$	..	222.7	10.9	223.7	11.0	224.7	11.0	225.7	11.1	226.7	11.1	227.7	11.2	..	$7\frac{3}{4}$
	3	222.7	11.7	223.7	11.7	224.7	11.8	225.7	11.8	226.7	11.9	227.7	11.9	87	
	4	222.5	15.6	223.5	15.6	224.5	15.7	225.4	15.8	226.4	15.8	227.4	15.9	86	
	5	222.2	19.4	223.1	19.5	224.1	19.6	225.1	19.7	226.1	19.8	227.1	19.9	85	
$\frac{1}{2}$	..	221.9	21.9	222.9	22.0	223.9	22.1	224.9	22.2	225.9	22.2	226.9	22.3	..	$7\frac{1}{2}$
	6	221.8	23.3	222.8	23.4	223.8	23.5	224.8	23.6	225.8	23.7	226.8	23.8	84	
	7	221.3	27.2	222.3	27.3	223.3	27.4	224.3	27.5	225.3	27.7	226.3	27.8	83	
	8	220.8	31.0	221.8	31.2	222.8	31.3	223.8	31.5	224.8	31.6	225.8	31.7	82	
$\frac{3}{4}$	..	220.6	32.7	221.6	32.9	222.6	33.0	223.5	33.2	224.5	33.3	225.5	33.4	..	$7\frac{1}{4}$
	9	220.3	34.9	221.2	35.0	222.2	35.2	223.2	35.4	224.2	35.5	225.2	35.7	81	
	10	219.6	38.7	220.6	38.9	221.6	39.1	222.6	39.2	223.6	39.4	224.5	39.6	80	
	11	218.9	42.6	219.9	42.7	220.9	42.9	221.8	43.1	222.8	43.3	223.8	42.5	79	
1	..	218.7	43.5	219.7	43.7	220.7	43.9	221.7	44.1	222.6	44.3	223.6	44.5	..	7
	12	218.1	46.4	219.1	46.6	220.1	46.8	221.1	47.0	222.0	47.2	223.0	47.4	78	
	13	217.3	50.2	218.3	50.4	219.2	50.6	220.2	50.8	221.2	51.1	222.2	51.3	77	
	14	216.4	53.9	217.3	54.2	218.3	54.4	219.3	54.7	220.3	54.9	221.2	55.2	76	
$1\frac{1}{4}$	..	216.3	54.2	217.3	54.4	218.3	54.7	219.2	54.9	220.2	55.2	221.2	55.4	..	$6\frac{3}{4}$
	15	215.4	57.7	216.4	58.0	217.3	58.2	218.3	58.5	219.3	58.8	220.2	59.0	75	
	16	214.4	61.5	215.3	61.7	216.3	62.0	217.2	62.3	218.2	62.6	219.2	62.8	74	
$1\frac{1}{2}$	..	213.4	64.7	214.4	65.0	215.3	65.3	216.3	65.6	217.2	65.9	218.2	66.2	..	$6\frac{1}{2}$
	17	213.3	65.2	214.2	65.5	215.2	65.8	216.1	66.1	217.1	66.4	218.0	66.7	73	
	18	212.1	68.9	213.0	69.2	214.0	69.5	214.9	69.8	215.9	70.1	216.8	70.5	72	
	19	210.9	72.6	211.8	72.9	212.7	73.3	213.7	73.6	214.6	73.9	215.6	74.2	71	
$1\frac{3}{4}$	..	210.0	75.1	210.9	75.5	211.8	75.8	212.8	76.1	213.7	76.5	214.7	76.8	..	$6\frac{1}{4}$
	20	209.6	76.3	210.5	76.6	211.4	77.0	212.4	77.3	213.3	77.6	214.2	78.0	70	
	21	208.2	79.9	209.1	80.3	210.1	80.6	211.0	81.0	211.9	81.3	212.9	81.7	69	
	22	206.8	83.5	207.7	83.9	208.6	84.3	209.5	84.7	210.5	85.0	211.4	85.4	68	
2	..	206.0	85.3	207.0	85.7	207.9	86.1	208.8	86.5	209.7	86.9	210.6	87.3	..	6
	23	205.3	87.1	206.2	87.5	207.1	87.9	208.0	88.3	209.0	88.7	209.9	89.1	67	
	24	203.7	90.7	204.6	91.1	205.5	91.5	206.5	91.9	207.4	92.3	208.3	92.7	66	
	25	202.1	94.2	203.0	94.7	203.9	95.1	204.8	95.5	205.7	95.9	206.6	96.4	65	
$2\frac{1}{4}$	..	201.6	95.4	202.5	95.8	203.4	96.2	204.3	96.6	205.2	97.1	206.1	97.5	..	$5\frac{3}{4}$
	26	200.4	97.8	201.3	98.2	202.2	98.6	203.1	99.1	204.0	99.5	204.9	99.9	64	
	27	198.7	101.2	199.6	101.7	200.5	102.1	201.4	102.6	202.3	103.1	203.1	103.5	63	
	28	196.9	104.7	197.8	105.2	198.7	105.6	199.5	106.1	200.4	105.6	201.3	107.0	62	
$2\frac{1}{2}$	..	196.7	105.1	197.6	105.6	198.4	106.1	199.3	106.5	200.2	107.0	201.1	107.5	..	$5\frac{1}{2}$
	29	195.0	108.1	195.9	108.6	196.8	109.1	197.7	109.6	198.5	110.1	199.4	110.5	61	
	30	193.1	111.5	194.0	112.0	194.9	112.5	195.7	113.0	196.6	113.5	197.5	114.0	60	
$2\frac{3}{4}$	..	191.3	114.6	192.1	115.2	193.0	115.7	193.8	116.2	194.7	116.7	195.6	117.2	..	$5\frac{1}{4}$
	31	191.1	114.9	192.0	115.4	192.9	115.9	193.7	116.4	194.6	116.9	195.4	117.4	59	
	32	189.1	118.2	190.0	118.7	190.8	119.2	191.7	119.8	192.5	120.3	193.4	120.8	58	
	33	187.0	121.5	187.9	122.0	188.7	122.5	189.5	123.1	190.4	123.6	191.2	124.2	57	
3	..	185.4	123.9	186.2	124 4	187.1	125.0	187.9	125.6	188.7	126.1	189.6	126.7	..	5
	34	184.9	124.7	185.7	125.3	186.5	125.8	187.4	126.4	188.2	126.9	189.0	127.5	56	
	35	182.7	127.9	183.5	128.5	184.3	129.1	185.1	129.6	185.9	130.2	186.8	130.8	55	
	36	180.4	131.1	181.2	131.7	182.0	132.3	182.8	132.8	183.6	133.4	184.5	134.0	54	
$3\frac{1}{4}$	..	179.1	132.8	179.9	133.4	180.7	134.0	181.5	134.6	182.3	135.2	183.1	135.8	..	$4\frac{3}{4}$
	37	178.1	134.2	178.9	134.8	179.7	135.4	180.5	136.0	181.3	136.6	182.1	137.2	53	
	38	175.7	137.3	176.5	137.9	177.3	138.5	178.1	139.1	178.9	139.8	179.7	140.4	52	
	39	173.3	140.3	174.1	141.0	174.9	141.6	175.6	142.2	176.4	142.9	177.2	143.5	51	
$3\frac{1}{2}$	..	172.4	141.5	173.1	142.1	173.9	142.7	174.7	143.4	175.5	144.0	176.2	144.6	..	$4\frac{1}{2}$
	40	170.8	143.3	171.6	144.0	172.4	144.6	173.7	145.3	173.9	145.9	174.7	146.6	50	
	41	168.3	146.3	169.1	147.0	169.8	147.6	170.6	148.3	171.3	148.9	172.1	149.6	49	
	42	165.7	149.2	166.5	149.9	167.2	150.6	168.0	151.2	168.7	151.9	169.4	152.6	48	
$3\frac{3}{4}$	..	165.2	149.7	166.0	150.4	166.7	151.1	167.4	151.8	168.2	152.4	168.9	153.1	..	$4\frac{1}{4}$
	43	163.1	152.1	163.8	152.8	164.6	153.4	163.3	154.1	166.0	154.8	166.7	155.5	47	
	44	160.4	154.9	161.1	155.6	161.9	156.3	162.6	157.0	163.3	157.7	164.0	158.4	46	
4	45	157.7	157.7	158.4	158.4	159.1	159.1	159.8	159.8	160.5	160.5	161.2	161.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		223		224		225		226		227		228		Rumos	

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Rumos		Distancia												Rumos	
		229		230		231		232		233		234			
Pt.	Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
	1	229.0	4.0	230.0	4.0	231.0	4.0	232.0	4.0	233.0	4.1	234.0	4.1	89	
	2	228.9	8.0	229.9	8.0	230.9	8.1	231.9	8.1	232.9	8.1	233.9	8.2	88	
1/4	..	228.7	11.2	229.7	11.3	230.7	11.3	231.7	11.4	232.7	11.4	233.7	11.5	..	7 3/4
	3	228.7	12.0	229.7	12.0	230.7	12.1	231.7	12.1	232.7	12.2	233.7	12.2	87	
	4	228.4	16.0	229.4	16.0	230.4	16.1	231.4	16.2	232.4	16.3	233.4	10.3	86	
	5	228.1	20.0	229.1	20.0	230.1	20.1	231.1	20.2	232.1	20.3	233.1	20.4	85	
1/2	..	227.9	22.4	228.9	22.5	229.9	22.6	230.9	22.7	231.9	22.8	232.9	22.9	..	7 1/2
	6	227.7	23.9	228.7	24.0	229.7	24.1	230.7	24.3	231.7	24.4	232.7	24.5	84	
	7	227.3	27.9	228.3	28.0	229.3	28.1	230.3	28.3	231.3	28.4	232.3	28.5	83	
	8	226.8	31.9	227.8	32.0	228.8	32.1	229.7	32.3	230.7	32.4	231.7	32.6	82	
3/4	..	226.5	33.6	227.5	33.7	228.5	33.9	229.5	34.0	230.5	34.2	231.5	34.3	..	7 1/4
	9	226.2	35.8	227.2	36.0	228.2	36.1	229.1	36.3	230.1	36.4	231.1	36.6	81	
	10	225.5	39.8	226.5	39.9	227.5	40.1	228.5	40.3	229.5	40.5	230.4	40.6	80	
	11	224.8	43.7	225.8	43.9	226.8	44.1	227.7	44.3	228.7	44.5	229.7	44.6	79	
1	..	224.6	44.7	225.6	44.9	226.6	45.1	227.5	45.3	228.5	45.5	229.5	45.7	..	7
	12	224.0	47.6	225.0	47.8	226.0	48.0	226.9	48.2	227.9	48.4	228.9	48.7	78	
	13	223.1	51.5	224.1	51.7	225.1	52.0	226.1	52.2	227.0	52.4	228.0	52.6	77	
	14	222.2	55.4	223.2	55.6	224.1	55.9	225.1	56.1	226.1	56.4	227.0	50.6	76	
1/4	..	222.1	55.6	223.1	55.9	224.1	56.1	225.1	56.4	226.0	56.6	227.0	56.9	..	6 3/4
	15	221.2	59.3	222.2	59.5	223.1	59.8	224.1	60.0	2.5.1	60.3	226.0	60.6	75	
	16	220.1	63.1	221.1	63.4	222.1	63.7	223.0	63.9	224.0	64.2	224.9	64.5	74	
1/2	..	219.1	66.5	220.1	66.8	221.1	67.0	222.0	67.3	223.0	67.6	223.9	67.9	..	6 1/2
	17	219.0	67.0	220.0	67.2	220.9	67.5	221.9	67.8	222.8	68.1	223.8	68.4	73	
	18	217.8	70.8	218.7	71.1	219.7	71.4	220.6	71.7	221.6	72.0	222.5	72.3	72	
	19	216.5	74.6	217.5	74.9	218.4	75.2	219.4	75.5	220.3	75.9	221.3	76.2	71	
3/4	..	215.6	77.1	216.5	77.5	217.5	77.8	218.4	78.2	219.4	78.5	220.3	78.8	..	6 1/4
	20	215.2	78.3	216.1	78.7	217.1	79.0	218.0	79.3	218.9	79.7	219.0	80.0	70	
	21	213.8	82.1	214.7	82.4	215.7	82.8	216.6	83.1	217.5	83.5	218.5	83.9	69	
	22	212.3	85.8	213.3	86.2	214.2	86.5	215.1	86.9	216.0	87.3	217.0	87.7	68	
2	..	211.6	87.6	212.5	88.0	213.4	88.4	214.3	88.2	215.3	89.2	216.2	89.6	..	6
	23	210.8	89.5	211.7	89.9	212.6	90.3	213.6	90.6	214.5	91.0	215.4	91.4	67	
	24	209.2	93.1	210.1	93.5	211.0	94.0	211.9	94.4	212.9	94.8	213.8	95.2	66	
	25	207.5	96.8	208.5	97.2	209.4	97.6	210.3	98.0	211.2	98.5	212.1	98.9	65	
1/4	..	207.0	97.9	207.9	98.3	208.8	98.8	209.7	99.2	210.6	99.6	211.5	100.1	..	5 3/4
	26	205.8	100.4	206.7	100.8	207.6	101.3	208.5	101.7	209.4	102.1	210.3	102.6	64	
	27	204.0	104.0	204.6	104.4	205.8	104.9	206.7	105.3	207.6	105.8	208.5	106.2	63	
1/2	28	202.2	107.5	203.1	108.0	204.0	108.4	204.8	108.9	205.7	109.4	206.6	109.9	62	
	..	202.0	107.9	202.8	108.4	203.7	108.9	204.6	109.4	205.5	109.8	206.4	110.3	..	5 1/2
	29	200.3	111.0	201.2	111.5	202.0	112.0	202.9	112.5	203.8	113.0	204.7	11 1.4	61	
	30	198.3	114.5	199.2	115.0	200.1	115.5	200.9	116.0	201.8	116.5	202.6	117.0	60	
3/4	..	196.4	117.7	197.3	118.2	198.1	118.8	199.0	119.3	199.8	119.8	200.7	120.3	..	5 1/4
	31	196.3	117.9	197.1	118.5	198.0	119.0	198.9	119.5	199.7	120.0	200.6	120.5	59	
	32	194.2	121.4	195.1	121.9	195.0	122.4	196.7	122.9	197.6	123.5	198.4	124.0	58	
	33	192.1	124.7	192.9	125.3	193.7	125.8	194.6	126.4	195.4	126.9	196.2	127.4	57	
3	..	190.4	127.2	191.2	127.8	192.1	128.3	192.9	128.9	193.7	129.4	194.6	130.0	..	5
	34	189.8	128.1	190.7	128.6	191.5	129.2	192.3	129.7	193.2	130.3	194.0	130.9	56	
	35	187.6	131.3	188.4	131.9	189.2	132.5	190.0	133.1	190.9	133.6	191.7	134.2	55	
	36	185.3	134.6	186.1	135.2	186.9	135.8	187.7	136.4	188.5	137.0	189.3	137.5	54	
1/4	..	183.9	136.4	184.7	137.0	185.5	137.6	186.3	138.2	187.1	138.8	187.9	139.4	..	4 3/4
	37	182.9	137.8	183.7	138.4	184.5	139.0	185.3	139.6	186.1	140.2	186.9	140.8	53	
	38	180.5	141.0	181.2	141.6	182.0	142.2	182.8	142.8	183.6	143.4	184.4	144.1	52	
	39	178.0	144.1	178.7	144.7	179.5	145.4	180.3	146.0	181.1	146.6	181.9	147.3	51	
1/2	..	177.0	145.3	177.8	145.9	178.6	146.5	179.3	147.2	180.1	147.8	180.9	148.4	..	4 1/2
	40	175.4	147.2	176.2	147.8	177.0	148.5	177.7	149.1	178.5	149.8	179.3	150.4	50	
	41	172.8	150.2	173.6	150.9	174.3	151.5	175.1	152.2	175.8	152.9	176.6	153.5	49	
3/4	42	170.2	153.2	170.9	153.9	171.7	154.6	172.4	155.2	173.2	155.9	173.9	156.6	48	
	..	169.7	153.8	170.4	154.5	171.2	155.1	171.9	155.8	172.6	156.5	173.4	157.1	..	4 1/4
	43	167.5	156.2	168.2	156.9	168.9	157.5	169.7	158.2	170.4	158.9	171.1	159.6	47	
	44	164.7	159.1	165.4	159.8	166.2	160.5	166.9	161.2	167.6	161.9	168.3	162.6	46	
	45	161.9	161.9	162.6	162.6	163.3	163.3	164.0	164.0	164.8	164.8	165.5	165.5	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		229		230		231		232		233		234		Rumos	

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Rumos Pt.	Gr.	Distancia 235 Lt.	235 Ap.	236 Lt.	236 Ap.	237 Lt.	237 Ap.	238 Lt.	238 Ap.	239 Lt.	239 Ap.	240 Lt.	240 Ap.	Gr.	Rumos Pt.
	1	235.0	4.1	236.0	4.1	237.0	4.1	238.0	4.2	239.0	4.2	240.0	4.2	89	
	2	234.9	8.2	235.9	8.2	236.9	8.3	237.9	8.3	238.9	8.3	239.9	8.4	88	
$\frac{1}{4}$	..	234.7	11.5	235.7	11.6	236.7	11.6	237.7	11.7	238.7	11.7	239.7	11.8	..	$7\frac{3}{4}$
	3	234.7	12.3	235.7	12.4	236.7	12.4	237.7	12.5	238.7	12.5	239.7	12.6	87	
	4	234.4	16.4	235.4	16.5	236.4	16.5	237.4	16.6	238.4	16.7	239.4	16.7	86	
	5	234.1	20.5	235.1	20.6	236.1	20.7	237.1	20.7	238.1	20.8	239.1	20.9	85	
$\frac{1}{2}$	..	233.9	23.0	234.9	23.1	235.9	23.2	236.9	23.3	237.8	22.4	238.8	23.5	..	$7\frac{1}{2}$
	6	233.7	24.6	234.7	24.7	235.7	24.8	236.7	24.9	237.7	25.0	238.7	25.1	84	
	7	233.2	28.6	234.2	28.8	235.2	28.9	236.2	29.0	237.2	29.1	238.2	29.2	83	
	8	232.7	32.7	233.7	32.8	234.7	33.0	235.7	33.1	236.7	33.3	237.7	33.4	82	
$\frac{3}{4}$	..	232.4	34.5	233.4	34.6	234.4	34.8	235.4	34.9	236.4	35.1	237.4	35.2	..	$7\frac{1}{4}$
	9	232.1	36.8	233.1	36.9	234.1	37.1	235.1	37.2	236.1	37.4	237.0	37.5	81	
	10	231.4	40.8	232.4	41.0	233.4	41.2	234.4	41.3	235.4	41.5	236.4	41.7	80	
	11	230.7	44.8	231.7	45.0	232.6	45.2	233.6	45.4	234.6	45.6	235.6	45.8	79	
1	..	230.5	45.8	231.5	46.0	232.4	46.2	233.4	46.4	234.4	46.6	235.4	46.8	..	7
	12	229.9	48.9	230.8	49.1	231.8	49.3	232.8	49.5	233.8	49.7	234.8	49.9	78	
	13	229.0	52.9	230.0	53.1	230.9	53.3	231.9	53.5	232.9	53.8	233.8	54.0	77	
	14	228.0	56.9	229.0	57.1	230.0	57.3	230.9	57.6	231.9	57.8	232.9	58.1	76	
$1\frac{1}{4}$	..	228.0	57.1	228.9	57.3	229.9	57.6	230.9	57.8	231.8	58.1	232.8	58.3	..	$6\frac{3}{4}$
	15	227.0	60.8	228.0	61.1	228.9	61.3	229.9	61.6	230.9	61.9	231.8	62.1	75	
	16	225.9	64.8	226.9	65.1	227.8	65.3	228.8	65.6	229.7	65.9	230.7	66.2	74	
$1\frac{1}{2}$	..	224.9	68.2	225.8	68.5	226.8	68.8	227.8	69.1	228.7	69.4	229.7	69.7	..	$6\frac{1}{2}$
	17	224.7	68.7	225.7	69.0	226.6	69.3	227.6	69.6	228.6	69.9	229.5	70.2	73	
	18	223.5	72.6	224.4	72.9	225.4	73.2	226.4	73.5	227.3	73.9	228.3	74.2	72	
	19	222.2	76.5	223.1	76.8	224.1	77.2	225.0	77.5	226.0	77.8	226.9	78.1	71	
$1\frac{3}{4}$	..	221.3	79.2	222.2	79.5	223.1	79.8	224.1	80.2	225.0	80.5	226.0	80.8	..	$6\frac{1}{4}$
	20	220.8	80.4	221.8	80.7	222.7	81.1	223.6	81.4	224.6	81.7	225.5	82.1	70	
	21	219.4	84.2	220.3	84.6	221.3	84.9	222.2	85.3	223.1	85.6	224.1	86.1	69	
	22	217.9	88.0	218.8	88.4	219.7	88.8	220.7	89.2	221.6	89.5	222.5	89.9	68	
2	..	217.1	89.9	218.0	90.3	219.0	90.7	219.9	91.1	220.8	91.5	221.7	91.8	..	6
	23	216.3	91.8	217.2	92.2	218.2	92.6	219.1	93.0	220.0	93.4	220.9	93.8	67	
	24	214.7	95.6	215.6	96.0	216.5	96.4	217.4	96.8	218.3	97.2	219.3	97.6	66	
	25	213.0	99.3	213.9	99.7	214.8	100.2	215.7	100.6	216.6	101.0	217.5	101.4	65	
$2\frac{1}{4}$	..	212.4	100.5	213.3	100.9	214.2	101.3	215.1	101.8	216.1	102.2	217.0	102.6	..	$5\frac{3}{4}$
	26	211.2	103.0	212.1	103.5	213.0	103.9	213.9	104.3	214.8	104.8	215.7	105.2	64	
	27	209.4	106.7	210.3	107.1	211.2	107.6	212.1	108.0	213.0	108.5	213.8	109.0	63	
	28	207.5	110.3	208.4	110.8	209.3	111.3	210.1	111.7	211.0	112.2	211.9	112.7	62	
$2\frac{1}{2}$	..	207.3	110.8	208.1	111.2	209.0	111.7	209.9	112.2	210.8	112.7	211.7	113.1	..	$5\frac{1}{2}$
	29	205.5	113.9	206.4	114.4	207.3	114.9	208.2	115.4	209.0	115.9	209.9	116.4	61	
	30	203.5	117.5	204.4	118.0	205.2	118.5	206.1	119.0	207.0	119.5	207.8	120.0	60	
$2\frac{3}{4}$	..	201.6	120.8	202.4	121.3	203.3	121.8	204.1	122.4	205.0	122.9	205.9	123.4	..	$5\frac{1}{4}$
	31	201.4	121.0	202.3	121.5	203.1	122.1	204.0	122.6	204.9	123.1	205.7	123.6	59	
	32	199.3	124.5	200.1	125.1	201.0	125.6	201.8	126.1	202.7	126.7	203.5	127.2	58	
	33	197.1	128.0	197.9	128.5	198.8	129.1	199.6	129.6	200.4	130.2	201.3	130.7	57	
3	..	195.4	130.6	196.2	131.1	197.1	131.7	197.9	132.2	198.7	132.8	199.5	133.3	..	5
	34	194.8	131.4	195.7	132.0	196.5	132.5	197.3	133.1	198.1	133.6	199.0	134.2	56	
	35	192.5	134.8	193.3	135.4	194.1	135.9	195.0	136.5	195.8	137.1	196.6	137.7	55	
	36	190.1	138.1	190.9	138.7	191.7	139.3	192.5	139.9	193.4	140.5	194.2	141.1	54	
$3\frac{1}{4}$	..	188.8	140.0	189.6	140.6	190.4	141.2	191.2	141.8	192.0	142.4	192.8	143.0	..	$4\frac{3}{4}$
	37	187.7	141.4	188.5	142.0	189.3	142.6	190.1	143.2	190.9	143.8	191.7	144.4	53	
	38	185.2	144.7	186.0	145.3	186.8	145.9	187.5	146.5	189.3	147.1	189.1	147.8	52	
$3\frac{1}{2}$	39	182.6	147.9	183.4	148.5	184.2	149.1	185.0	149.8	185.7	150.4	186.5	151.0	51	
	..	181.7	149.1	182.4	149.7	183.2	150.3	184.0	151.0	184.7	151.6	185.5	152.3	..	$4\frac{1}{2}$
	40	180.0	151.1	180.8	151.7	181.6	152.3	182.3	153.0	183.1	153.6	183.9	154.3	50	
	41	177.4	154.2	178.1	154.8	178.9	155.5	179.6	156.1	180.4	156.8	181.1	157.5	49	
	42	174.6	157.2	175.4	157.9	176.1	158.6	176.9	159.3	177.6	159.9	178.4	160.6	48	
$3\frac{3}{4}$	..	174.1	157.8	174.9	158.5	175.6	159.1	176.3	159.8	177.1	160.5	177.8	161.2	..	$4\frac{1}{4}$
	43	171.9	160.3	172.6	161.0	173.3	161.6	174.1	162.3	174.8	163.0	175.5	163.7	47	
	44	169.0	163.2	169.8	163.9	170.5	164.6	171.2	165.3	171.9	166.0	172.6	166.7	46	
4	45	166.2	166.2	166.9	166.9	167.6	167.6	168.3	168.3	169.0	169.0	169.7	169.7	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		235		236		237		238		239		240			Rumos

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Rumos		Distancia												Rumos	
		241		242		243		244		245		246			
Pt.	Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
	1	241.0	4.2	242.0	4.2	243.0	4.2	244.0	4.3	245.0	4.3	246.0	4.3	89	
1/4	2	240.9	8.4	241.9	8.4	242.9	8.5	243.9	8.5	244.9	8.6	245.9	8.6	88	
	..	240.7	11.8	241.7	11.9	242.7	11.9	243.7	12.0	244.7	12.0	245.7	12.1	..	7 3/4
	3	240.7	12.6	241.7	12.7	242.7	12.7	243.7	12.8	244.7	12.8	245.7	12.9	87	
	4	240.4	16.8	241.4	16.9	242.4	17.0	243.4	17.0	244.4	17.1	245.4	17.2	86	
	5	240.1	21.0	241.1	21.1	242.1	21.2	243.1	21.3	244.1	21.4	245.1	21.4	85	
1/2	..	239.8	23.6	240.8	23.7	241.8	23.8	242.8	23.9	243.8	24.0	244.8	24.1	..	7 1/2
	6	239.7	25.2	240.7	25.3	241.7	25.4	242.7	25.5	243.7	25.6	244.7	25.7	84	
	7	239.2	29.4	240.2	29.5	241.2	29.6	242.2	29.7	243.2	29.9	244.2	30.0	83	
	8	238.7	33.5	239.6	33.7	240.6	33.8	241.6	34.0	242.6	34.1	243.6	34.2	82	
3/4	..	238.4	35.4	239.4	35.5	240.4	35.7	241.4	35.8	242.3	35.9	243.3	36.1	..	7 1/4
	9	238.0	37.7	239.0	37.9	240.0	38.0	241.0	38.2	242.0	38.3	243.0	38.5	81	
	10	237.3	41.8	238.3	42.0	239.3	42.2	240.3	42.4	241.3	42.5	242.3	42.7	80	
	11	236.6	46.0	237.6	46.2	238.5	46.4	239.5	46.6	240.5	46.7	241.5	46.9	79	
1	.	236.4	47.0	237.4	47.2	238.3	47.4	239.3	47.6	240.3	47.8	241.3	48.0	..	7
	12	235.7	50.1	236.7	50.3	237.7	50.5	238.7	50.7	239.6	50.9	240.6	51.1	78	
	13	234.8	54.2	235.8	54.4	236.8	54.7	237.7	54.9	238.7	55.1	239.7	55.3	77	
1/4	14	233.8	58.3	234.8	58.5	235.8	58.8	236.8	59.0	237.7	59.3	238.7	59.5	76	
	..	233.8	58.6	234.4	58.8	235.7	59.0	236.7	59.3	237.7	59.5	238.6	59.8	..	6 3/4
	15	232.8	62.4	233.8	62.6	234.7	62.9	235.7	63.2	236.7	63.4	237.6	63.7	75	
	16	231.7	66.4	232.6	66.7	233.6	67.0	234.5	67.3	235.5	67.5	236.5	67.8	74	
1/2	..	230.6	70.0	231.6	70.2	232.5	70.5	233.5	70.8	234.5	71.1	235.4	71.4	..	6 1/2
	17	230.5	70.5	231.4	70.8	232.4	71.0	233.3	71.3	234.3	71.6	235.3	71.9	73	
	18	229.2	74.5	230.2	74.8	231.1	75.1	232.1	75.4	233.0	75.7	234.0	76.0	72	
	19	227.9	78.5	228.8	78.8	229.8	79.1	230.7	79.4	231.7	79.8	232.6	80.1	71	
3/4	..	226.9	81.2	227.9	81.5	228.8	81.9	229.7	82.2	230.7	82.5	231.6	82.9	..	6 1/4
	20	226.5	82.4	227.4	82.8	228.3	83.1	229.3	83.5	230.2	83.8	231.2	84.1	70	
	21	225.0	86.4	225.9	86.7	226.9	87.1	227.8	87.4	228.7	87.8	229.7	88.2	69	
	22	223.5	90.3	224.4	90.7	225.3	91.0	226.2	91.4	227.2	91.8	228.1	92.2	68	
2	..	222.7	92.2	223.6	92.6	224.5	93.0	225.4	93.4	226.4	93.8	227.3	94.1	..	6
	23	221.8	94.2	222.8	94.6	223.7	94.9	224.6	95.3	225.5	95.7	226.4	96.1	67	
	24	220.2	98.0	221.1	98.4	222.0	98.8	222.9	99.2	223.8	99.7	224.7	100.1	66	
	25	218.4	101.9	219.3	102.3	220.2	102.7	221.1	103.1	222.0	103.5	223.0	104.0	65	
2 1/4	..	217.9	103.0	218.8	103.5	219.7	103.9	220.6	104.3	221.5	104.8	222.4	105.2	..	5 3/4
	26	216.6	105.6	217.5	106.1	218.4	106.5	219.3	107.0	220.2	107.4	221.1	107.8	64	
	27	214.7	109.4	215.6	109.9	216.5	110.3	217.4	110.8	218.3	111.2	219.2	111.7	63	
	28	212.8	113.1	213.7	113.6	214.6	114.1	215.4	114.6	216.3	115.0	217.2	115.5	62	
2 1/2	..	212.5	113.6	213.4	114.1	214.3	114.6	215.2	115.0	216.1	115.5	217.0	116.0	..	5 1/2
	29	210.8	116.8	211.7	117.3	212.5	117.8	213.4	118.3	214.3	118.8	215.2	119.3	61	
	30	208.7	120.5	209.6	121.0	210.4	121.5	211.3	122.0	212.2	122.5	213.0	123.0	60	
2 3/4	..	206.7	123.9	207.6	124.4	208.4	124.9	209.3	125.4	210.1	125.9	211.0	126.5	..	5 1/4
	31	206.6	124.1	207.4	124.6	208.3	125.2	209.1	125.7	210.0	126.2	210.9	126.7	59	
	32	204.4	127.7	205.2	128.2	206.1	128.8	206.9	129.3	207.8	129.8	208.6	130.4	58	
	33	202.1	131.3	203.0	131.8	203.8	132.3	204.6	132.9	205.5	133.4	206.3	134.0	57	
3	..	200.4	133.9	201.2	134.4	202.0	135.0	202.9	135.6	203.7	136.1	204.5	136.7	..	5
	34	199.8	134.8	200.6	135.3	210.5	135.9	202.3	136.4	203.1	137.0	203.9	137.6	56	
	35	197.4	138.2	198.2	138.8	199.1	139.4	199.9	140.0	200.7	140.5	201.5	141.1	55	
	36	195.0	141.7	195.2	142.2	196.6	142.8	197.4	143.4	198.2	144.0	199.0	144.6	54	
3 1/4	..	196.3	143.6	194.4	144.2	195.2	144.8	196.0	145.4	196.8	146.0	197.6	146.5	..	4 3/4
	37	192.5	145.0	193.3	145.6	194.1	146.2	194.9	146.8	195.7	147.4	196.5	148.0	53	
	38	189.9	148.4	190.7	149.0	191.5	149.6	192.3	150.2	193.1	150.8	193.9	151.5	52	
	39	187.3	151.7	188.1	152.3	188.8	152.9	189.6	153.6	190.4	154.2	191.2	154.8	51	
3 1/2	..	183.6	152.9	187.1	153.5	187.8	154.2	188.6	154.8	189.4	155.4	190.2	156.1	..	4 1/2
	40	184.6	154.9	185.4	155.6	186.1	156.2	186.9	156.8	187.7	157.5	188.4	158.1	50	
	41	181.9	158.1	182.6	158.8	183.4	159.4	184.1	160.1	184.9	160.7	185.7	161.4	49	
	42	179.1	161.3	179.8	161.9	180.6	162.6	181.3	163.3	182.1	163.9	182.8	164.6	48	
3 3/4	..	178.6	161.8	179.3	162.5	180.0	163.2	180.8	163.8	181.5	164.5	182.3	165.2	..	4 1/4
	43	176.3	164.4	177.0	165.0	177.7	165.7	178.5	166.4	179.2	167.1	179.9	167.8	47	
	44	173.4	167.4	174.1	168.1	174.8	168.8	175.5	169.5	176.2	170.2	177.0	170.9	46	
4	45	170.4	170.4	171.1	171.1	171.8	171.8	172.5	172.5	173.2	173.2	173.9	173.9	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		241		242		243		244		245		246			Rumos

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Rumos Pt.	Gr.	Distancia 247 Lt.	247 Ap.	248 Lt.	248 Ap.	249 Lt.	249 Ap.	250 Lt.	250 Ap.	251 Lt.	251 Ap.	252 Lt.	252 Ap.	Gr.	Rumos Pt.
	1	247.0	4.3	248.0	4.3	249.0	4.3	250.0	4.4	251.0	4.4	252.0	4.4	89	
	2	246.8	8.6	247.8	8.7	248.8	8.7	249.8	8.7	250.8	8.8	251.8	8.8	88	
1/4	..	246.7	12.1	247.7	12.2	248.7	12.2	249.7	12.3	250.7	12.3	251.7	12.4	..	3/4
	3	246.7	12.9	247.7	13.0	248.7	13.0	249.7	13.1	250.7	13.1	251.7	13.2	87	
	4	246.4	17.2	247.4	17.3	248.4	17.4	249.4	17.4	250.4	17.5	251.4	17.6	86	
	5	246.1	21.5	247.1	21.6	248.1	21.7	249.0	21.8	250.0	21.9	251.0	22.0	85	
1/2	..	245.8	24.2	246.8	24.3	247.8	24.4	248.8	24.5	249.8	24.6	250.8	24.7	..	1/2
	6	245.6	25.8	246.6	25.9	247.6	26.0	248.6	26.1	249.6	26.2	250.6	26.3	84	
	7	245.2	30.1	246.2	30.2	247.1	30.3	248.1	30.5	249.1	30.6	250.1	30.7	83	
	8	244.6	34.4	245.6	34.5	246.6	34.7	247.6	34.8	248.6	34.9	249.5	35.1	82	
3/4	..	244.3	36.2	245.3	36.4	246.3	36.5	247.3	36.7	248.3	36.8	249.3	37.0	..	1/4
	9	244.0	38.6	244.9	38.8	245.9	39.0	246.9	39.1	247.9	39.3	248.9	39.4	81	
	10	243.2	42.9	244.2	43.1	245.2	43.2	246.2	43.4	247.2	43.6	248.2	43.8	80	
	11	242.5	47.1	243.4	47.3	244.4	47.5	245.4	47.7	246.4	47.9	247.4	48.1	79	
1	..	242.3	48.2	243.2	48.4	244.2	48.6	245.2	48.8	246.2	49.0	247.2	49.2	..	7
	12	241.6	51.4	242.6	51.6	243.6	51.8	244.5	52.0	245.5	52.2	246.5	52.4	78	
	13	240.7	55.6	241.6	55.8	242.6	56.0	243.6	56.2	244.6	56.5	245.5	56.7	77	
	14	239.7	59.8	240.6	60.0	241.6	60.2	242.6	60.5	243.5	60.7	244.5	61.0	76	
1 1/4	..	239.6	60.0	240.6	60.3	241.5	60.5	242.5	60.7	243.5	61.0	244.5	61.2	..	6 3/4
	15	238.6	63.9	239.5	64.2	240.5	64.4	241.5	64.7	242.4	65.0	243.4	65.2	75	
	16	237.4	68.1	238.4	68.4	239.4	68.6	240.3	68.9	241.3	69.2	242.2	69.5	74	
1 1/2	..	236.4	71.7	237.3	72.0	238.3	72.3	239.2	72.6	240.2	72.9	241.2	73.2	..	6 1/2
	17	236.2	72.2	237.2	72.5	238.1	72.8	239.1	73.1	240.0	73.4	241.0	73.7	73	
	18	234.9	76.3	235.9	76.6	236.8	76.9	237.8	77.3	238.7	77.6	239.7	77.9	72	
	19	233.5	80.4	234.5	80.7	235.4	81.1	236.4	81.4	237.3	81.7	238.3	82.0	71	
1 3/4	..	232.6	83.2	233.5	83.5	234.4	83.9	235.4	84.2	236.3	84.6	237.3	84.9	..	6 1/4
	20	232.1	84.5	233.0	84.8	234.0	85.2	234.9	85.5	235.9	85.8	236.8	86.2	70	
	21	230.6	88.5	231.5	88.9	232.5	89.2	233.4	89.6	234.3	90.0	235.3	90.3	69	
	22	229.0	92.5	229.9	92.9	230.9	93.3	231.8	93.7	232.7	94.0	233.7	94.4	68	
2	..	228.2	94.5	229.1	94.9	230.1	95.3	231.0	95.7	231.9	96.1	232.8	96.4	..	6
	23	227.4	96.5	228.3	96.9	229.2	97.3	230.1	97.7	231.0	98.1	232.0	98.5	67	
	24	225.6	100.5	226.6	100.9	227.5	101.3	228.4	101.7	229.3	102.1	230.2	102.5	66	
	25	223.9	104.4	224.8	104.8	225.7	105.2	226.6	105.7	227.5	106.1	228.4	106.5	65	
2 1/4	..	223.3	105.6	224.2	106.0	225.1	106.5	226.0	106.9	226.9	107.3	227.8	107.8	..	5 3/4
	26	222.0	108.3	222.9	108.7	223.8	109.2	224.7	109.6	225.6	110.0	226.5	110.5	64	
	27	220.1	112.1	221.0	112.6	221.9	113.0	222.8	113.5	223.6	114.0	224.5	114.4	63	
	28	218.1	116.0	219.0	116.4	219.9	116.9	220.7	117.4	221.6	117.8	222.5	118.3	62	
2 1/2	..	217.8	116.4	218.7	116.9	219.6	117.4	220.5	117.8	221.4	118.3	222.2	118.8	..	5 1/2
	29	216.0	119.7	216.9	120.2	217.8	120.7	218.7	121.2	219.5	121.7	220.4	122.2	61	
	30	213.9	123.5	214.8	124.0	215.6	124.5	216.5	125.0	217.4	125.5	218.2	126.0	60	
2 3/4	..	211.9	127.0	212.7	127.5	213.6	128.0	214.4	128.5	215.3	129.0	216.1	129.5	..	5 1/4
	31	211.7	127.2	212.6	127.7	213.4	128.2	214.3	128.8	215.1	129.3	216.0	129.8	59	
	32	209.5	130.9	210.3	131.4	211.2	131.9	212.0	132.5	212.9	133.0	213.7	133.5	58	
	33	207.2	134.5	208.0	135.1	208.8	135.6	209.7	136.2	210.5	136.7	211.3	137.2	57	
3	..	205.4	137.2	206.2	137.8	207.0	138.3	207.9	138.9	208.7	139.4	209.5	140.0	..	5
	34	204.8	138.1	205.6	138.7	206.4	139.2	207.3	139.8	208.1	140.4	208.9	140.9	56	
	35	202.3	141.7	203.1	142.2	204.0	142.8	204.8	143.4	205.6	144.0	206.4	144.5	55	
	36	199.8	145.2	200.6	145.8	201.4	146.4	202.3	146.9	203.1	147.5	203.9	148.1	54	
3 1/4	..	198.4	147.1	199.2	147.7	200.0	148.3	200.8	148.9	201.6	149.5	202.4	150.1	..	4 3/4
	37	197.3	148.6	198.1	149.3	198.9	149.9	199.7	150.5	200.5	151.1	201.3	151.7	53	
	38	194.6	152.1	195.4	152.7	196.2	153.3	197.0	153.9	197.8	154.5	198.6	155.1	52	
	39	192.0	155.4	192.7	156.1	193.5	156.7	194.3	157.3	195.1	158.0	195.8	158.6	51	
3 1/2	..	190.9	156.7	191.7	157.3	192.5	158.0	193.2	158.6	194.0	159.2	194.8	159.9	..	4 1/2
	40	189.2	158.8	190.0	159.4	190.7	160.1	191.5	160.7	192.3	161.3	193.0	162.0	50	
	41	186.4	162.0	187.2	162.7	187.9	163.4	188.7	164.0	189.4	164.7	190.2	165.3	49	
	42	183.6	165.3	184.3	165.9	185.0	166.6	185.8	167.3	186.5	168.0	187.3	168.6	48	
3 3/4	..	183.0	165.9	183.8	166.5	184.5	167.2	185.2	167.9	186.0	168.5	186.7	169.2	..	4 1/4
	43	180.6	168.5	181.4	169.1	182.1	169.8	182.8	170.5	183.6	171.2	184.3	171.9	47	
	44	177.7	171.6	178.4	172.3	179.1	173.0	179.8	173.7	180.6	174.4	181.3	175.1	46	
4	45	174.7	174.7	175.4	175.4	176.1	176.1	176.8	176.8	177.5	177.5	178.2	178.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		247		248		249		250		251		252			Rumos

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Rumos Pt.	Gr.	Distancia 253 Lt.	253 Ap.	254 Lt.	254 Ap.	255 Lt.	255 Ap.	256 Lt.	256 Ap.	257 Lt.	257 Ap.	258 Lt.	258 Ap.	Gr.	Rumos Pt.
	1	253.0	4.4	254.0	4.4	255.0	4.5	256.0	4.5	257.0	4.5	258.0	4.5	89	
	2	252.8	8.8	253.8	8.9	254.8	8.9	255.8	8.9	256.8	9.0	257.8	9.0	88	
1/4	..	252.7	12.4	253.7	12.5	254.7	12.5	255.7	12.6	256.7	12.6	257.7	12.7	.	7 3/4
	3	252.7	13.2	253.7	13.3	254.7	13.3	255.6	13.4	256.6	13.5	257.6	13.5	87	
	4	252.4	17.6	253.4	17.7	254.4	17.8	255.4	17.9	256.4	17.9	257.4	18.0	86	
	5	252.0	22.1	253.0	22.1	254.0	22.2	255.0	22.3	256.0	22.4	257.0	22.5	85	
1/2	..	251.8	24.8	252.8	24.9	253.8	25.0	254.8	25.1	255.8	25.2	256.8	25.3	.	7 1/2
	6	251.6	26.4	252.6	26.6	253.6	26.7	254.6	26.8	255.6	26.9	256.6	27.0	84	
	7	251.1	30.8	252.1	31.0	253.1	31.1	254.1	31.2	255.1	31.3	256.1	31.4	83	
	8	250.5	35.2	251.5	35.3	252.5	35.5	253.5	35.6	254.5	35.8	255.5	35.9	82	
3/4	..	250.3	37.1	251.2	37.3	252.2	37.4	253.2	37.6	254.2	37.7	255.2	37.9	..	7 1/4
	9	249.9	39.6	250.9	39.7	251.9	39.9	252.8	40.0	253.8	40.2	254.8	40.4	81	
	10	249.2	43.9	250.1	44.1	251.1	44.3	252.1	44.5	253.1	44.6	254.1	44.8	80	
	11	248.4	48.3	249.3	48.5	250.3	48.7	251.3	48.8	252.3	49.0	253.3	49.2	79	
1	..	248.1	49.4	249.1	49.6	250.1	49.7	251.1	49.9	252.1	50.1	253.0	50.3	..	7
	12	247.5	52.6	248.4	52.8	249.4	53.0	250.4	53.2	251.4	53.4	252.4	53.6	78	
	13	246.5	56.9	247.5	57.1	248.5	57.4	249.4	57.6	250.4	57.8	251.4	58.0	77	
	14	245.5	61.2	246.5	61.4	247.4	61.7	248.4	61.9	249.4	62.2	250.3	62.4	76	
1 1/4	..	245.4	61.5	246.4	61.7	247.4	62.0	248.3	62.2	249.3	62.5	250.3	62.7	..	6 3/4
	15	244.4	65.5	245.3	65.7	246.3	66.0	247.3	66.3	248.2	66.5	249.2	66.8	75	
	16	243.2	69.7	244.2	70.0	245.1	70.3	246.1	70.6	247.0	70.8	248.0	71.1	74	
1 1/2	..	242.1	73.4	243.1	73.7	244.0	74.0	245.0	74.3	245.9	74.6	246.9	74.9	..	6 1/2
	17	241.9	74.0	242.9	74.3	243.9	74.6	244.8	74.8	245.8	75.1	246.7	75.4	73	
	18	240.6	78.2	241.6	78.5	242.5	78.8	243.5	79.1	244.4	79.4	245.4	79.7	72	
	19	239.2	82.4	240.2	82.7	241.1	83.0	242.1	83.3	243.0	83.7	243.9	84.0	71	
1 3/4	..	238.2	85.2	239.1	85.6	240.1	85.9	241.0	86.2	242.0	86.6	242.9	86.9	..	6 1/4
	20	237.7	86.5	238.7	86.9	239.6	87.2	240.6	87.6	241.5	87.9	242.4	88.2	70	
	21	236.2	90.7	237.1	91.0	238.1	91.4	239.0	91.7	239.9	92.1	240.9	92.5	69	
	22	234.6	94.8	235.5	95.2	236.4	95.5	237.4	95.9	238.3	96.3	239.2	96.6	68	
2	..	233.7	96.8	234.7	97.2	235.6	97.6	236.5	98.0	237.4	98.4	238.4	98.7	..	6
	23	232.9	98.9	233.8	99.2	234.7	99.6	235.6	100.0	236.6	100.4	237.5	100.8	67	
	24	231.1	102.9	232.0	103.3	233.0	103.7	233.9	104.1	234.8	104.5	235.7	104.9	66	
	25	229.3	106.9	230.2	107.3	231.1	107.8	232.0	108.2	232.9	108.6	233.8	109.0	65	
2 1/4	..	228.7	108.2	229.6	108.6	230.5	109.0	231.4	109.5	232.3	109.9	233.2	110.3	..	5 3/4
	26	227.4	110.9	228.3	111.3	229.2	111.8	230.1	112.2	231.0	112.7	231.9	113.1	64	
	27	225.4	114.9	226.3	115.3	227.2	115.8	228.1	116.2	229.0	116.7	229.9	117.1	63	
	28	223.4	118.8	224.3	119.2	225.2	119.7	226.0	120.2	226.9	120.7	227.8	121.1	62	
2 1/2	..	223.1	119.3	224.0	119.7	224.9	120.2	225.8	120.7	226.7	121.1	227.5	121.6	..	5 1/2
	29	221.3	122.7	222.2	123.1	223.0	123.6	223.9	124.1	224.8	124.6	225.7	125.1	61	
	30	219.1	126.5	220.0	127.0	220.8	127.5	221.7	128.0	222.6	128.5	223.4	129.0	60	
3/4	..	217.0	130.1	217.9	130.6	218.7	131.1	219.6	131.6	220.4	132.1	221.3	132.6	..	5 1/4
	31	216.9	130.3	217.7	130.8	218.6	131.3	219.4	131.8	220.3	132.4	221.1	132.9	59	
	32	214.6	134.1	215.4	134.6	216.3	135.1	217.1	135.7	217.9	136.2	218.8	136.7	58	
	33	212.2	137.8	213.0	138.3	213.9	138.9	214.7	139.4	215.5	140.0	216.4	140.5	57	
	..	210.4	140.6	211.2	141.1	212.0	141.7	212.9	142.2	213.7	142.8	214.5	143.3	..	5
	34	209.7	141.5	210.6	142.0	211.4	142.6	212.2	143.2	213.1	143.7	213.9	144.3	56	
	35	207.2	145.1	208.1	145.7	208.9	146.3	209.7	146.8	210.5	147.4	211.3	148.0	55	
	36	204.7	148.7	205.5	149.3	206.3	149.9	207.1	150.5	207.9	151.1	208.7	151.6	54	
1/4	..	203.2	150.7	204.0	151.3	204.8	151.9	205.6	152.5	206.4	153.1	207.2	153.7	..	4 3/4
	37	202.1	152.3	202.9	152.9	203.7	153.5	204.5	154.1	205.2	154.7	206.0	155.3	53	
	38	199.4	155.8	200.2	156.4	200.9	157.0	201.7	157.6	202.5	158.2	203.3	158.8	52	
	39	196.6	159.2	197.4	159.8	198.2	160.5	198.9	161.1	199.7	161.7	200.5	162.4	51	
1/2	..	195.6	160.5	196.3	161.1	197.1	161.8	197.9	162.4	198.7	163.0	199.4	163.7	..	4 1/2
	40	193.8	162.6	194.6	163.3	195.3	163.9	196.1	164.6	196.9	165.2	197.6	165.8	50	
	41	190.9	166.0	191.7	166.6	192.5	167.3	193.2	168.0	194.0	168.6	194.7	169.3	49	
	42	188.0	169.3	188.8	170.0	189.5	170.6	190.2	171.3	191.0	172.0	191.7	172.6	48	
3/4	..	187.5	169.9	188.2	170.6	188.9	171.2	189.7	171.9	190.4	172.6	191.2	173.2	..	4 1/4
	43	185.0	172.5	185.8	173.2	186.5	173.9	187.2	174.6	188.0	175.3	188.7	176.0	47	
	44	182.0	175.7	182.7	176.4	183.4	177.1	184.2	177.8	184.9	178.5	185.6	179.2	46	
	45	178.9	178.9	179.6	179.6	180.3	180.3	181.0	181.0	181.7	181.7	182.4	182.4	45	4
	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		253		254		255		256		257		258			Rumos

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Rumos Pt.	Gr.	Distancia 259 Lt.	259 Ap.	260 Lt.	260 Ap.	261 Lt.	261 Ap.	262 Lt.	262 Ap.	263 Lt.	263 Ap.	264 Lt.	264 Ap.	Rumos Gr.	Pt.
	1	259.0	4.5	260.0	4.5	261.0	4.6	262.0	4.6	263.0	4.6	264.0	4.6	89	
	2	258.8	9.0	259.8	9.1	260.8	9.1	261.8	9.1	262.8	9.2	263.8	9.2	88	
1/4	..	258.7	12.7	259.7	12.8	260.7	12.8	261.7	12.9	262.7	12.9	263.7	13.0	..	7 3/4
	3	258.6	13.6	259.6	13.6	260.6	13.7	261.6	13.7	262.6	13.8	263.6	13.8	87	
	4	258.4	18.1	259.4	18.1	260.4	18.2	261.4	18.3	262.4	18.3	263.4	18.4	86	
	5	258.0	22.6	259.0	22.7	260.0	22.7	261.0	22.8	262.0	22.9	263.0	23.0	85	
1/2	..	257.8	25.4	258.7	25.5	259.7	25.6	260.7	25.7	261.7	25.8	262.7	25.9	..	7 1/2
	6	257.6	27.1	258.6	27.2	259.6	27.3	260.6	27.4	261.6	27.5	262.6	27.6	84	
	7	257.1	31.6	258.1	31.7	259.1	31.8	266.0	31.9	261.0	32.1	262.0	32.2	83	
	8	256.5	36.0	257.5	36.2	258.5	36.3	259.5	36.5	260.4	36.6	261.4	36.7	82	
3/4	..	256.2	38.0	257.2	38.1	258.2	38.3	259.2	38.4	260.2	38.6	261.1	38.7	..	7 1/4
	9	255.6	40.5	256.8	40.7	257.8	40.8	258.8	41.0	259.8	41.1	260.7	41.3	81	
	10	255.1	45.0	256.1	45.1	257.0	45.3	258.0	45.5	259.0	45.7	260.0	45.8	80	
	11	254.2	49.4	255.2	49.6	256.2	49.8	257.2	50.0	258.2	50.2	259.1	50.4	79	
1	..	254.0	50.5	255.0	50.7	256.0	50.9	257.0	51.1	257.9	51.3	258.9	51.5	..	7
	12	253.3	52.8	254.3	54.1	255.3	54.3	256.3	54.5	257.3	54.7	258.2	54.9	78	
	13	252.4	58.3	253.3	58.5	254.3	58.7	255.3	58.9	256.3	59.2	257.2	59.4	77	
	14	251.3	62.7	252.3	62.9	253.2	63.1	254.2	63.4	255.2	63.6	256.2	63.9	76	
1 1/4	..	251.2	62.9	252.2	63.2	253.2	63.4	254.2	63.7	255.1	63.9	256.1	64.2	..	6 3/4
	15	250.2	67.0	251.1	67.3	252.1	67.6	253.1	67.8	254.0	68.1	255.0	68.3	75	
	16	249.0	71.4	249.9	71.7	250.9	71.9	251.9	72.2	252.8	72.5	253.8	72.8	74	
1 1/2	..	247.9	75.2	248.8	75.5	249.8	75.8	250.7	76.1	251.7	76.3	252.6	76.6	..	6 1/2
	17	247.7	75.7	248.6	76.0	249.6	76.3	250.6	76.6	251.5	76.9	252.5	77.2	73	
	18	246.3	80.0	247.3	80.3	248.2	80.7	249.2	81.0	250.1	81.3	251.1	81.6	72	
	19	244.9	84.3	245.8	84.6	246.8	85.0	247.7	85.3	248.7	85.6	249.6	86.0	71	
1 3/4	..	243.9	87.3	244.8	87.6	245.7	87.9	246.7	88.3	247.6	88.6	248.6	88.9	..	6 1/4
	20	243.4	88.6	244.3	88.9	245.3	89.3	246.2	89.6	247.1	90.0	248.1	90.3	70	
	21	241.8	92.8	242.7	93.2	243.7	93.5	244.6	93.9	245.5	94.3	246.5	94.6	69	
	22	240.1	97.0	241.1	97.4	242.0	97.8	242.9	98.1	243.8	98.5	244.8	98.9	68	
2	..	239.3	99.1	240.2	99.5	241.1	99.9	242.1	100.3	243.0	100.6	243.9	101.0	..	6
	23	238.4	101.2	239.3	101.6	240.3	102.0	241.2	102.4	242.1	102.8	243.0	103.2	67	
	24	236.0	105.3	237.5	105.8	238.4	106.2	239.3	106.6	240.3	107.0	241.2	107.4	66	
	25	234.7	109.5	235.6	109.9	236.5	110.3	237.5	110.7	238.4	111.1	239.3	111.6	65	
2 1/4	..	234.1	110.7	235.0	111.2	235.9	111.6	236.8	112.0	237.7	112.5	238.7	112.9	..	5 3/4
	26	232.8	113.5	233.7	114.0	234.6	114.4	235.5	114.9	236.4	115.3	237.3	115.7	64	
	27	230.8	117.6	231.7	118.0	232.6	118.5	233.4	118.9	234.3	119.4	235.2	119.9	63	
	28	228.7	121.6	229.6	122.1	230.4	122.5	231.3	123.0	232.2	123.5	233.1	123.9	62	
2 1/2	..	228.4	122.1	229.3	122.6	230.2	123.0	231.1	123.5	231.9	124.0	232.8	124.4	..	5 1/2
	29	226.5	125.6	227.4	126.1	228.3	126.5	229.2	127.0	230.0	127.5	230.9	128.0	61	
	30	224.3	129.5	225.2	130.0	226.0	130.5	226.9	131.0	227.8	131.5	228.6	132.0	60	
2 3/4	..	222.2	133.1	223.0	133.7	223.9	134.2	224.7	134.7	225.6	135.2	226.4	135.7	..	5 1/4
	31	222.0	133.4	222.9	133.9	223.7	134.4	224.6	134.9	225.4	135.5	226.3	136.0	59	
	32	219.6	137.2	220.5	137.8	221.3	138.3	222.2	138.8	223.0	139.4	223.9	139.9	58	
	33	227.2	141.1	218.1	141.6	218.9	142.2	219.7	142.7	220.6	143.2	221.4	143.8	57	
3	..	215.3	143.9	216.2	144.4	217.0	145.0	217.8	145.6	218.7	146.1	219.5	146.7	..	5
	34	214.7	144.8	215.5	145.4	216.4	145.9	217.2	146.5	218.0	147.1	218.9	147.6	56	
	35	212.2	148.6	213.0	149.1	213.8	149.7	214.6	150.3	215.4	150.9	216.3	151.4	55	
	36	209.5	152.2	210.3	152.8	211.2	153.4	212.0	154.0	212.8	154.0	213.6	155.2	54	
3 1/4	..	208.0	154.3	208.8	154.9	209.6	155.5	210.4	156.1	211.2	156.7	212.0	157.3	..	4 3/4
	37	206.8	155.9	207.6	156.5	208.4	157.1	209.2	157.7	210.0	158.3	210.8	158.9	53	
	38	204.1	159.5	204.9	160.1	205.7	160.7	206.5	161.3	207.2	161.9	208.0	162.5	52	
	39	201.3	163.0	202.1	163.6	202.8	164.3	203.6	164.9	204.4	165.5	205 2	166.1	51	
3 1/2	..	200.2	164.3	201.0	164.9	201.8	165.6	202.5	166.2	203.3	166.8	204.1	167.5	..	4 1/2
	40	198.4	166.5	199.2	167.1	199.9	167.8	200.7	168.4	201.5	169.1	202.2	169.7	50	
	41	195.5	169.9	196.2	170.6	197.0	171.2	197.7	171.9	198.5	172.5	199.2	173.2	49	
	42	192.5	173.3	193.2	174.0	194.0	174.6	194.7	175.3	195.4	176.0	196.2	176.7	48	
3 3/4	..	191.9	173.9	192.6	177.6	193.4	175.3	194.1	175.9	194.9	176.6	195.6	177.3	..	4 1/4
	43	189.4	176.6	190.2	177.3	190.9	178.0	191.6	178.7	192.3	179.4	193.1	180.0	47	
	44	186.3	179.9	187.0	180.6	187.7	181.3	188.5	172.0	189.2	182.7	189.9	183.4	46	
4	45	183.1	183.1	183.8	183.8	184.6	184.6	185.3	185.3	186.0	186.0	186.7	186.7	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		259		260		261		262		263		264			Rumos

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Rumos Pt.	Gr.	Distancia 265 Lt.	265 Ap.	266 Lt.	266 Ap.	267 Lt.	267 Ap.	268 Lt.	268 Ap.	269 Lt.	269 Ap.	270 Lt.	270 Ap.	Gr.	Rumos Pt.
	1	265.0	4.6	266.0	4.6	267.0	4.7	268.0	4.7	269.0	4.7	270.0	4.7	89	
1/4	2	264.8	9.2	265.8	9.3	266.8	9.3	267.8	9.4	268.8	9.4	269.8	9.4	88	
	..	264.7	13.0	265.7	13.1	266.7	13.1	267.7	13.2	268.7	13.2	269.7	13.3	..	7 3/4
	3	264.6	13.9	265.6	13.9	266.6	14.0	267.6	14.0	268.6	14.1	269.6	14.1	87	
	4	264.4	18.5	265.4	18.6	266.3	18.6	267.3	18.7	268.3	18.8	269.3	18.8	86	
1/2	5	264.0	23.1	265.0	23.2	266.0	23.3	267.0	23.4	268.0	23.4	269.0	23.5	85	
	..	263.7	26.0	264.7	26.1	265.7	26.2	266.7	26.3	267.7	26.4	268.7	26.5	..	7 1/2
	6	263.5	27.7	264.5	27.8	265.5	27.9	266.5	28.0	267.5	28.1	268.5	28.2	84	
	7	263.0	32.3	264.0	32.4	265.0	32.5	266.0	32.7	267.0	32.8	268.0	32.9	83	
	8	262.4	36.9	263.4	37.0	264.4	37.2	265.4	37.3	266.4	37.4	267.4	37.6	82	
3/4	..	262.1	38.9	263.1	39.0	264.1	39.2	265.1	39.3	266.1	39.5	267.1	39.6	..	7 3/4
	9	261.7	41.5	262.7	41.6	263.7	41.8	264.7	41.9	265.7	42.1	266.7	42.2	81	
	10	261.0	46.0	262.0	46.2	262.9	46.4	263.9	46.5	264.9	46.7	265.9	46.9	80	
	11	260.1	50.6	261.1	50.8	262.1	50.9	263.1	51.1	264.1	51.3	265.0	51.5	79	
1	..	259.9	51.7	260.9	51.9	261.9	52.1	262.8	52.3	263.8	52.5	264.8	52.7	..	7
	12	259.2	55.1	260.2	55.3	261.2	55.5	262.1	55.7	263.1	55.9	264.1	56.1	78	
	13	258.2	59.6	259.2	59.8	260.2	60.1	261.1	60.3	262.1	60.5	263.1	60.7	77	
1 1/4	14	257.1	64.1	258.1	61.4	259.1	64.6	260.0	64.8	261.0	65.1	262.0	65.3	76	
	..	257.1	64.4	258.0	64.6	259.0	64.9	260.0	65.1	260.9	65.4	261.9	65.6	..	6 3/4
	15	256.0	68.6	256.9	68.8	257.9	69.1	258.9	69.4	259.8	69.6	260.8	69.9	75	
1 1/2	16	254.7	73.0	255.7	73.3	256.7	73.6	257.6	73.9	258.6	74.1	259.5	74.4	74	
	..	253.6	76.9	254.6	77.2	255.5	77.5	256.5	77.8	257.4	78.1	258.4	78.4	..	6 1/2
	17	253.4	77.5	254.4	77.8	255.3	78.1	256.3	78.4	257.2	78.6	258.2	78.9	73	
	18	252.0	81.9	253.0	82.2	253.9	82.5	254.9	82.8	255.8	83.1	256.8	83.4	72	
	19	250.6	86.3	251.5	86.6	252.5	80.9	253.4	87.3	254.3	87.6	255.3	87.9	71	
1 3/4	..	249.5	89.3	250.5	89.6	251.4	89.9	252.3	90.3	253.3	90.6	254.2	91.0	..	6 1/4
	20	249.0	90.6	250.0	91.0	250.9	91.3	251.8	91.7	252.8	92.0	253.7	92.3	70	
	21	247.4	95.0	248.3	95.3	249.3	95.7	250.2	96.0	251.1	96.4	252.1	96.8	69	
	22	245.7	99.3	246.6	99.6	247.6	100.0	248.5	100.4	249.4	100.8	250.3	101.1	68	
2	..	244.8	101.4	245.8	101.8	246.7	102.2	247.6	102.6	248.5	102.9	249.5	103.3	..	6
	23	243.9	103.5	244.9	103.9	245.8	104.3	246.7	104.7	247.6	105.1	248.5	105.5	67	
	24	242.1	107.8	243.0	108.2	243.9	108.6	244.8	109.0	245.7	109.4	246.7	109.8	66	
2 1/4	25	240.2	112.0	241.1	112.4	242.0	112.8	242.9	113.3	243.8	113.7	244.7	114.1	65	
	..	239.6	113.3	240.5	113.7	241.4	114.2	242.3	114.6	243.2	115.0	244.1	115.4	..	5 3/4
	26	238.2	116.2	239.1	116.6	240.0	117.0	240.9	117.5	241.8	117.9	242.7	118.4	64	
	27	236.1	120.3	237.0	120.8	237.9	121.2	238.8	121.7	239.7	122.1	240.6	122.6	63	
2 1/2	28	234.0	124.4	234.9	124.9	235.7	125.3	236.6	125.8	237.5	126.3	238.4	126.8	62	
	..	233.7	124.9	234.6	125.4	235.5	125.9	236.4	126.3	237.2	126.8	238.1	127.3	..	5 1/2
	29	231.8	128.5	232.6	129.0	233.5	129.4	234.4	129.9	235.3	130.4	236.1	130.9	61	
	30	229.5	132.5	230.4	133.0	231.2	133.5	232.1	134.0	233.0	134.5	233.8	135.0	60	
2 3/4	..	227.3	136.2	228.2	136.7	229.0	137.3	229.9	137.8	230.7	138.3	231.6	138.8	..	5 1/4
	31	227.1	136.5	228.0	137.0	228.9	137.5	229.7	138.0	230.6	138.5	231.4	139.1	59	
	32	224.7	140.4	225.6	141.0	226.4	141.5	227.3	142.0	228.1	142.5	229.0	143.1	58	
	33	222.2	144.3	223.1	144.9	223.9	145.4	224.8	146.0	225.6	146.5	226.4	147.1	57	
3	..	220.3	147.2	221.2	147.8	222.0	148.3	222.8	148.9	223.7	149.4	224.5	150.0	..	5
	34	219.7	148.2	220.5	148.7	221.4	149.3	222.2	149.9	223.0	150.4	223.8	151.0	56	
	35	217.1	152.0	217.9	152.6	218.7	153.1	219.5	153.7	220.4	154.3	221.2	154.9	55	
	36	214.4	155.8	215.2	156.4	216.0	156.9	216.8	157.5	217.6	158.1	218.4	158.7	54	
3 1/4	..	212.8	157.6	213.6	158.5	214.5	159.1	215.3	159.6	216.1	160.2	216.9	160.8	..	4 3/4
	37	211.6	159.5	212.4	160.1	213.2	160.7	214.0	161.3	214.8	161.9	215.6	162.5	53	
	38	208.8	163.2	209.6	163.8	210.4	164.4	211.2	165.0	212.0	165.6	212.8	166.2	52	
	39	205.9	166.8	206.7	167.4	207.5	168.0	208.3	168.7	209.1	169.3	209.8	169.9	51	
3 1/2	..	204.8	168.1	205.6	168.7	206.4	169.4	207.2	170.0	207.9	170.6	208.7	171.3	..	4 1/2
	40	203.0	170.3	203.8	171.0	204.5	171.6	205.3	172.3	206.1	172.9	206.8	173.6	50	
	41	200.0	173.9	200.8	174.5	201.5	175.2	202.3	175.8	203.0	176.5	203.8	177.1	49	
3 3/4	42	196.9	177.3	197.7	178.0	198.4	178.7	199.2	179.3	199.9	180.0	200.6	180.7	48	
	..	196.3	178.0	197.1	178.6	197.8	179.3	198.6	180.0	199.3	180.6	200.1	181.3	..	4 1/4
	43	193.8	180.7	194.5	181.4	195.3	182.1	196.0	182.8	196.7	183.5	197.5	184.1	47	
	44	190.6	184.1	191.3	184.8	192.1	185.5	192.8	186.2	193.5	186.9	194.2	187.6	46	
4	45	187.4	187.4	188.1	188.1	188.8	188.8	189.5	189.5	190.2	190.2	190.9	190.9	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		265		266		267		268		269		270			Rumos

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Rumos Pt.	Gr.	Distancia 271 Lt.	271 Ap.	272 Lt.	272 Ap.	273 Lt.	273 Ap.	274 Lt.	274 Ap.	275 Lt.	275 Ap.	276 Lt.	276 Ap.	Rumos Gr.	Pt.
	1	271.0	4.7	272.0	4.7	273.0	4.8	274.0	4.8	275.0	4.8	276.0	4.8	89	
1/4	2	270.8	9.5	271.8	9.5	272.8	9.5	273.8	9.6	274.8	9.6	275.8	9.6	88	
	..	270.7	13.3	271.7	13.3	272.7	13.4	273.7	13.4	274.7	13.5	275.7	13.5	..	7 3/4
	3	270.6	14.2	271.6	14.2	272.6	14.3	273.6	14.3	274.6	14.4	275.6	14.4	87	
	4	270.3	18.9	271.3	19.0	272.3	19.0	273.3	19.1	274.3	19.2	275.3	19.3	86	
	5	270.0	23.6	271.0	23.7	272.0	23.8	273.0	23.9	274.0	24.0	274.9	24.1	85	
1/2	..	269.7	26.6	270.7	26.7	271.7	26.8	272.7	26.9	273.7	27.0	274.7	27.1	..	7 1/2
	6	269.5	28.3	270.5	28.4	271.5	28.5	272.5	28.6	273.5	28.7	274.5	28.8	84	
	7	269.0	33.0	270.0	33.1	271.0	33.3	272.0	33.4	273.0	33.5	273.9	33.6	83	
	8	268.4	37.7	269.4	37.9	270.3	38.0	271.3	38.1	272.3	38.3	273.3	38.4	82	
3/4	..	268.1	39.8	269.0	39.9	270.0	40.1	271.0	40.2	272.0	40.4	273.0	40.5	..	7 1/4
	9	267.7	42.4	268.7	42.6	269.6	42.7	270.6	42.9	271.6	43.0	272.6	43.2	81	
	10	266.9	47.1	267.9	47.2	268.9	47.4	269.8	47.6	270.8	47.8	271.8	47.9	80	
	11	266.0	51.7	267.0	51.9	268.0	52.1	269.0	52.3	269.9	52.5	270.9	52.7	79	
1	..	265.8	52.9	266.8	53.1	267.8	53.3	268.7	53.5	269.7	53.6	270.7	53.8	..	7
	12	265.1	56.3	266.1	56.6	267.0	56.8	268.0	57.0	269.0	57.2	270.0	57.4	78	
	13	264.1	61.0	265.0	61.2	266.0	61.4	267.0	61.6	268.0	61.9	268.9	62.1	77	
	14	263.0	65.6	263.9	65.8	264.9	66.0	265.9	66.3	266.8	66.5	267.8	66.8	76	
1 1/4	..	262.9	65.9	263.9	66.1	264.8	66.3	265.8	66.6	266.8	66.8	267.7	67.1	..	6 3/4
	15	261.8	70.1	262.7	70.4	263.7	70.7	264.7	70.9	265.6	71.2	266.6	71.4	75	
	16	260.5	74.7	261.5	75.0	262.4	75.2	263.4	75.5	264.3	75.8	265.3	76.1	74	
1 1/2	..	259.3	78.7	260.3	79.0	261.2	79.2	262.2	79.5	263.2	69.8	264.1	80.1	..	6 1/2
	17	259.2	79.2	260.1	79.5	261.1	79.8	262.0	80.1	263.0	80.4	263.9	80.7	73	
	18	257.7	83.7	258.7	84.1	259.6	84.4	260.6	84.7	261.5	85.0	262.5	85.3	72	
	19	256.2	88.2	257.2	88.6	258.1	88.9	259.1	89.2	260.0	89.5	261.0	89.9	71	
1 3/4	..	255.2	91.3	256.1	91.6	257.0	92.0	258.0	92.3	258.9	92.6	259.9	93.0	..	6 1/4
	20	254.7	92.7	255.6	93.0	256.5	93.4	257.5	93.7	258.4	94.1	259.4	94.4	70	
	21	253.0	97.1	253.9	97.5	254.9	97.8	255.8	98.2	256.7	98.6	257.7	98.9	69	
	22	251.3	101.5	252.2	101.9	253.1	102.3	254.0	102.6	255.0	103.0	255.9	103.4	68	
2	..	250.4	103.7	251.3	104.1	252.2	104.5	253.1	104.9	254.1	105.2	255.0	105.0	..	6
	23	249.5	105.9	250.4	106.3	251.3	106.7	252.2	107.1	253.1	107.5	254.1	107.8	67	
	24	247.6	110.2	248.5	110.6	249.4	111.0	250.3	111.4	251.2	111.9	252.1	112.3	66	
	25	245.6	114.5	246.5	115.0	247.4	115.4	248.3	115.8	249.2	116.2	250.1	116.6	65	
2 1/4	..	245.0	115.9	245.9	116.3	246.8	116.7	247.7	117.2	248.6	117.6	249.5	118.0	..	5 3/4
	26	243.6	118.8	244.5	119.2	245.4	119.7	246.3	120.1	247.2	120.6	248.1	121.0	64	
	27	241.5	123.0	242.4	123.5	243.2	123.9	244.1	124.4	245.0	124.8	245.9	125.3	63	
	28	239.3	127.2	240.2	127.7	241.0	128.2	241.9	128.6	242.8	129.1	243.7	129.6	62	
2 1/2	..	239.0	127.7	239.9	128.2	240.8	128.7	241.7	129.2	242.5	129.6	243.4	130.1	..	5 1/2
	29	237.0	131.4	237.9	131.9	238.8	132.4	239.6	132.8	240.5	133.3	241.4	133.8	61	
	30	234.7	135.5	235.6	136.0	236.4	136.5	237.3	137.0	238.2	137.5	239.0	138.0	60	
2 3/4	..	232.4	139.3	233.3	139.8	234.2	140.3	235.0	140.9	235.9	141.4	236.7	141.9	..	5 1/4
	31	232.3	139.6	233.1	140.1	234.0	140.6	234.9	141.1	235.7	141.6	236.6	142.2	59	
	32	229.8	143.6	230.7	144.1	231.5	144.7	232.4	145.2	233.2	145.7	234.1	146.3	58	
	33	227.3	147.6	228.1	148.1	229.0	148.7	229.8	149.2	230.6	149.8	231.5	150.3	57	
3	..	225.3	150.6	226.2	151.1	227.0	151.7	227.8	152.2	228.6	152.8	229.5	153.3	..	5
	34	224.7	151.5	225.5	152.1	226.3	152.7	227.2	153.2	228.0	153.8	228.8	154.3	56	
	35	222.0	155.4	222.8	156.0	223.6	156.6	224.4	157.2	225.3	157.7	226.1	158.3	55	
	36	219.2	159.3	220.1	159.9	220.9	160.5	221.7	161.1	222.5	161.6	223.3	162.2	54	
3 1/4	..	217.7	161.4	218.5	162.0	219.3	162.6	220.1	163.2	220.9	163.8	221.7	164.4	..	4 3/4
	37	216.4	163.1	217.2	163.7	218.0	164.3	218.8	164.9	219.6	165.5	220.4	166.1	53	
	38	213.6	166.8	214.3	167.5	215.1	168.1	215.9	168.7	216.7	169.3	217.5	169.9	52	
	39	210.6	170.5	211.4	171.2	212.2	171.8	212.9	172.4	213.7	173.1	214.5	173.7	51	
3 1/2	..	209.5	171.9	210.3	172.6	211.0	173.2	211.8	173.8	212.6	174.5	213.3	175.1	..	4 1/2
	40	207.6	174.2	208.4	174.8	209.1	175.5	209.9	176.1	210.7	176.8	211.4	177.4	50	
	41	204.5	177.8	205.3	178.4	206.0	179.1	206.8	179.8	207.5	180.4	208.3	181.1	49	
	42	201.4	181.3	202.1	182.0	202.9	182.7	203.6	183.3	204.4	184.0	205.1	184.7	48	
3 3/4	..	200.8	182.0	201.5	182.7	202.3	183.3	203.0	184.0	203.8	184.7	204.5	185.3	..	4 1/4
	43	198.2	184.8	198.9	185.5	199.7	186.2	200.4	186.9	201.1	187.5	201.9	188.2	47	
	44	194.9	188.3	195.7	188.9	196.4	189.6	197.1	190.3	197.8	191.0	198.5	191.7	46	
4	45	191.6	191.6	192.3	192.3	193.0	193.0	193.7	193.7	194.5	194.5	195.2	195.2	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		271		272		273		274		275		276			Rumos

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Rumos Pt.	Gr.	Distancia 277 Lt.	277 Ap.	278 Lt.	278 Ap.	279 Lt.	279 Ap.	280 Lt.	280 Ap.	281 Lt.	281 Ap.	282 Lt.	282 Ap.	Gr.	Rumos Pt.
	1	277.0	4.8	278.0	4.9	279.0	4.9	280.0	4.9	281.0	4.9	282.0	4.9	89	
	2	276.8	9.7	277.8	9.7	278.8	9.7	279.8	9.8	280.8	9.8	281.8	9.8	88	
¼	..	276.7	13.6	277.7	13.6	278.7	13.7	279.7	13.7	280.7	13.8	281.7	13.8	..	7¾
	3	276.6	14.5	277.6	14.5	278.6	14.6	279.6	14.7	280.6	14.7	281.6	14.8	87	
	4	276.3	19.3	277.3	19.4	278.3	19.5	279.3	19.5	280.3	19.6	281.3	19.7	86	
	5	275.9	24.1	276.9	24.2	277.9	24.3	278.9	24.4	279.9	24.5	280.9	24.6	85	
½	..	275.7	27.2	276.7	27.3	277.7	27.3	278.7	27.4	279.6	27.5	280.6	27.6	..	7½
	6	275.5	29.0	276.5	29.1	277.5	29.2	278.5	29.3	279.5	29.4	280.5	29.5	84	
	7	274.9	33.8	275.9	33.9	276.9	34.0	277.9	34.1	278.9	34.2	279.9	34.4	83	
	8	274.3	38.6	275.3	38.7	276.3	38.8	277.3	39.0	278.3	39.1	279.3	39.2	82	
¾	..	274.0	40.6	275.0	40.8	276.0	40.9	277.0	41.1	278.0	41.2	278.9	41.4	..	7¼
	9	273.6	43.3	274.6	43.5	275.6	43.6	276.6	43.8	277.5	44.0	278.5	44.1	81	
	10	272.8	48.1	273.8	48.3	274.8	48.4	275.7	48.6	276.7	48.8	277.7	49.0	80	
	11	271.9	52.9	272.9	53.0	273.9	53.2	274.9	53.4	275.8	53.6	276.8	53.8	79	
1	..	271.7	54.0	272.7	54.2	273.6	54.4	274.6	54.6	275.6	54.8	276.6	55.0	..	7
	12	270.9	57.6	271.9	57.8	272.9	58.0	273.9	58.2	274.9	58.4	275.8	58.6	78	
	13	269.9	62.3	270.9	62.5	271.8	62.8	272.8	63.0	273.8	63.2	274.8	63.4	77	
	14	268.8	67.0	269.7	67.3	270.7	67.5	271.7	67.7	272.7	68.0	273.6	68.2	76	
1¼	..	268.7	67.3	269.7	67.6	270.6	67.8	271.6	68.0	272.6	68.3	273.6	68.5	..	6¾
	15	267.6	71.7	268.5	72.0	269.5	72.2	270.5	72.5	271.4	72.7	272.4	73.0	75	
	16	266.3	76.4	267.2	76.6	268.2	76.9	269.2	77.2	270.1	77.5	271.1	77.7	74	
1½	..	265.1	80.4	266.0	80.7	267.0	81.0	267.9	81.3	268.9	81.6	269.9	81.9	..	6½
	17	264.9	81.0	265.9	81.3	266.8	81.6	267.8	81.9	268.7	82.2	269.7	82.4	73	
	18	263.4	85.6	264.4	85.9	265.3	86.2	266.3	86.5	267.2	86.8	268.2	87.1	72	
	19	261.9	90.2	262.9	90.5	263.8	90.8	264.7	91.2	265.7	91.5	266.6	91.8	71	
1¾	..	260.8	93.3	261.7	93.7	262.7	94.0	263.6	94.3	264.6	94.7	265.5	95.0	..	6¼
	20	260.3	94.7	261.2	95.1	262.2	95.4	263.1	95.8	264.1	96.1	265.0	96.4	70	
	21	258.6	99.3	259.5	99.6	260.5	100.0	261.4	100.3	262.3	100.7	263.3	101.1	69	
	22	256.8	103.8	257.8	104.1	258.7	104.5	259.6	104.9	260.5	105.3	261.5	105.6	68	
2	..	255.9	106.0	256.8	106.4	257.8	106.8	258.7	107.2	259.6	107.5	260.5	107.9	..	6
	23	255.0	108.2	255.9	108.6	256.8	109.0	257.7	109.4	258.7	109.8	259.6	110.2	67	
	24	253.1	112.7	254.0	113.1	254.9	113.5	255.8	113.9	256.7	114.3	257.6	114.7	66	
	25	251.0	117.1	252.0	117.5	252.9	117.9	253.8	118.3	254.7	118.8	255.6	119.2	65	
2¼	..	250.4	118.4	251.3	118.9	252.2	119.3	253.1	119.7	254.0	120.2	254.9	120.6	..	5¾
	26	249.0	121.4	249.9	121.9	250.8	122.3	251.7	122.7	252.6	123.2	253.5	123.6	64	
	27	246.8	125.8	247.7	126.2	248.6	126.7	249.5	127.1	250.4	127.6	251.3	128.0	63	
	28	244.6	130.0	245.5	130.5	246.3	131.0	247.2	131.5	248.1	131.9	249.0	132.4	62	
2½	..	244.3	130.6	245.2	131.0	246.1	131.5	246.9	132.0	247.8	132.5	248.7	132.9	..	5½
	29	242.3	134.3	243.1	134.8	244.0	135.3	244.9	135.7	245.8	136.2	246.6	136.7	61	
	30	239.9	138.5	240.8	139.0	241.6	139.5	242.5	140.0	243.4	140.5	244.2	141.0	60	
2¾	..	237.6	142.4	238.4	142.9	239.3	143.4	240.2	143.9	241.0	144.5	241.9	145.0	..	5¼
	31	237.4	142.7	238.3	143.2	239.1	143.7	240.0	144.2	240.9	144.7	241.7	145.2	59	
	32	234.9	146.8	235.8	147.3	236.6	147.8	237.5	148.4	238.3	148.9	239.1	149.4	58	
	33	232.3	150.9	233.2	151.4	234.0	152.0	234.8	152.5	235.7	153.0	236.5	153.6	57	
3	..	230.3	153.9	231.1	154.4	232.0	155.0	232.8	155.6	233.6	156.1	234.5	156.7	..	5
	34	229.6	154.9	230.5	155.5	231.3	156.0	232.1	156.6	233.0	157.1	233.8	157.7	56	
	35	226.9	158.9	227.7	159.5	228.5	160.0	229.4	160.6	230.2	161.2	231.0	161.7	55	
	36	224.1	162.8	224.9	163.4	225.7	164.0	226.5	164.6	227.3	165.2	228.1	165.8	54	
3¼	..	222.5	165.0	223.3	165.6	224.1	166.2	224.9	166.8	225.7	167.4	226.5	168.0	..	4¾
	37	221.2	166.7	222.0	167.3	222.8	167.9	223.6	168.5	224.4	169.1	225.2	169.7	53	
	38	218.3	170.5	219.1	171.2	219.9	171.8	220.6	172.4	221.4	173.0	222.2	173.6	52	
	39	215.3	174.3	216.0	175.0	216.8	175.6	217.6	176.2	218.4	176.8	219.2	177.5	51	
3½	..	214.1	175.7	214.9	176.4	215.7	177.0	216.4	177.6	217.2	178.3	218.0	178.9	..	4½
	40	212.2	178.1	213.0	178.7	213.7	179.3	214.5	180.0	215.3	180.6	216.0	181.3	50	
	41	209.1	188.7	209.8	182.4	210.6	183.0	211.3	183.7	212.1	184.4	212.8	185.0	49	
	42	205.9	185.3	206.6	186.0	207.3	186.7	208.1	187.4	208.8	188.0	209.6	188.7	48	
3¾	..	205.2	186.0	206.0	186.7	206.7	187.4	207.5	188.0	208.2	188.7	208.9	189.4	..	4¼
	43	202.6	188.9	203.3	189.6	204.0	190.3	204.8	191.0	205.5	191.6	206.2	192.3	47	
	44	199.3	192.4	200.0	193.1	200.7	193.8	201.4	194.5	202.1	195.2	202.9	195.9	46	
4	45	195.9	195.9	196.6	196.6	197.3	197.3	198.0	198.0	198.7	198.7	199.4	199.4	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		277		278		279		280		281		282			Rumos

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Estima

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Rumos Pt.	Gr.	Distancia 283 Lt.	283 Ap.	284 Lt.	284 Ap.	285 Lt.	285 Ap.	286 Lt.	286 Ap.	287 Lt.	287 Ap.	288 Lt.	288 Ap.	Rumos Gr.	Pt.
	1	283.0	4.9	284.0	5.0	285.0	5.0	286.0	5.0	287.0	5.0	288.0	5.0	89	
	2	282.8	9.9	283.8	9.9	284.8	9.9	285.8	10.0	286.8	10.0	287.8	10.1	88	
	..	282.7	13.9	283.7	13.9	284.7	14.0	285.7	14.0	286.7	14.1	287.7	14.1	..	$7\frac{3}{4}$
	3	282.6	14.8	283.6	14.9	284.6	14.9	285.6	15.0	286.6	15.0	287.6	15.1	87	
	4	282.3	19.7	283.3	19.8	284.3	19.9	285.3	20.0	286.3	20.0	287.3	20.1	86	
	5	281.9	24.7	282.9	24.8	283.9	24.8	284.9	24.9	285.9	25.0	286.9	25.1	85	
	..	281.6	27.7	282.6	27.8	283.6	27.9	284.6	28.0	285.6	28.1	286.6	28.2	..	$7\frac{1}{2}$
	6	281.4	29.6	282.4	29.7	283.4	29.8	284.4	29.9	285.4	30.0	286.4	30.1	84	
	7	280.9	34.5	281.9	34.6	282.9	34.7	283.9	34.9	284.9	35.0	285.9	35.1	83	
	8	280.2	39.4	281.2	39.5	282.2	39.7	283.2	39.8	284.2	39.0	285.2	40.1	82	
	..	279.9	41.5	280.9	41.7	281.9	41.8	282.9	42.0	283.9	42.1	284.9	42.3	..	$7\frac{1}{4}$
	9	279.5	44.3	280.5	44.4	281.5	44.6	282.5	44.7	283.5	44.9	284.5	45.1	81	
	10	278.7	49.1	279.7	49.3	280.7	49.5	281.7	49.7	282.6	49.8	283.6	50.0	80	
	11	277.8	54.0	278.8	54.2	279.8	54.4	280.7	54.6	281.7	54.8	282.7	55.0	79	
1	..	277.6	55.2	278.5	55.4	279.5	55.6	280.5	55.8	281.5	56.0	282.5	56.2	..	7
	12	276.8	58.8	277.8	59.0	278.8	59.3	279.8	59.5	280.7	59.7	281.7	59.9	78	
	13	275.7	63.7	276.7	63.9	277.7	64.1	278.7	64.3	279.6	64.6	280.6	64.8	77	
	14	274.6	68.5	275.6	68.7	276.5	68.9	277.5	69.2	278.5	69.4	279.4	69.7	76	
	..	274.5	68.8	275.5	69.0	276.5	69.3	277.4	69.5	278.4	69.7	279.4	70.0	..	$6\frac{3}{4}$
	15	273.4	73.2	274.3	73.5	275.3	73.8	276.3	74.0	277.2	74.3	278.2	74.5	75	
	16	272.0	78.0	273.0	78.3	274.0	78.6	274.9	78.8	275.9	79.1	276.8	79.4	74	
	..	270.8	82.1	271.8	82.4	272.7	82.7	273.7	83.0	274.6	83.3	275.6	83.6	..	$6\frac{1}{2}$
	17	270.6	82.7	271.6	83.0	272.5	83.3	273.5	83.6	274.5	83.9	275.4	84.2	73	
	18	269.1	87.5	270.1	87.8	271.1	88.1	272.0	88.4	273.0	88.7	273.9	89.0	72	
	19	267.6	92.1	268.5	92.5	269.5	92.8	270.4	93.1	271.4	93.4	272.3	93.8	71	
	..	266.5	95.3	266.4	95.7	268.3	96.0	269.3	96.3	270.2	96.7	271.2	97.0	..	$6\frac{1}{4}$
	20	265.9	96.8	266.9	97.1	267.8	97.5	268.8	97.8	269.7	98.2	270.6	98.5	70	
	21	264.2	101.4	265.1	101.8	266.1	102.1	267.0	102.5	267.9	102.9	268.9	103.2	69	
	22	262.4	106.0	263.3	106.4	264.2	106.8	265.2	107.1	266.1	107.5	267.0	107.9	68	
2	..	261.5	108.3	262.4	108.7	263.3	109.1	264.2	109.5	265.2	109.8	266.1	110.2	..	6
	23	260.5	110.6	261.4	111.0	262.3	111.4	263.3	111.7	264.2	112.1	265.1	112.5	67	
	24	258.5	115.1	259.4	115.5	260.4	115.9	261.3	116.3	262.2	116.7	263.1	117.1	66	
	25	256.5	119.6	257.4	120.0	258.3	120.4	259.2	120.9	260.1	121.3	261.0	121.7	65	
	..	255.8	121.0	256.7	121.4	257.6	121.9	258.5	122.3	259.4	122.7	260.3	123.1	..	$5\frac{3}{4}$
	26	254.4	124.1	255.3	124.5	256.2	124.9	257.1	125.4	258.0	125.8	258.9	126.3	64	
	27	252.2	128.5	253.0	128.9	253.9	129.4	254.8	129.8	255.7	130.3	256.6	130.7	63	
	28	249.9	132.9	250.8	133.3	251.6	133.8	252.5	134.3	253.4	134.7	254.3	135.2	62	
	..	249.6	133.4	250.5	133.9	251.4	134.3	252.2	134.8	253.1	135.3	254.0	135.8	..	$5\frac{1}{2}$
	29	247.5	137.2	248.4	137.7	249.3	138.2	250.1	138.7	251.0	139.1	251.9	139.6	61	
	30	245.1	141.5	246.0	142.0	246.8	142.5	247.7	143.0	248.5	143.5	249.4	144.0	60	
	..	242.7	145.5	243.6	146.0	244.4	146.5	245.3	147.0	246.2	147.5	247.0	148.1	..	$5\frac{1}{4}$
	31	242.6	145.8	243.4	146.3	244.3	146.8	245.1	147.3	246.0	147.8	246.9	148.3	59	
	32	240.0	150.0	240.8	150.5	241.7	151.0	242.5	151.6	243.4	152.1	244.2	152.6	58	
	33	237.3	154.1	238.2	154.7	239.0	155.2	239.9	155.8	240.7	156.3	241.5	156.9	57	
3	..	235.3	157.2	236.1	157.8	237.0	158.3	237.8	158.9	238.6	159.4	239.5	160.0	..	5
	34	234.6	158.3	235.4	158.8	236.3	159.4	237.1	159.9	237.9	160.5	238.8	161.0	56	
	35	231.8	162.3	232.6	162.9	233.5	163.5	234.3	164.0	235.1	161.6	235.9	165.2	55	
	36	229.0	166.3	229.8	166.9	230.6	167.5	231.4	168.1	232.2	168.7	233.0	169.3	54	
	..	227.3	168.6	228.1	169.2	228.9	169.8	229.7	170.4	230.5	171.0	231.3	171.6	..	$4\frac{3}{4}$
	37	226.0	170.3	226.8	170.9	227.6	171.5	228.4	172.1	229.2	172.7	230.0	173.3	53	
	38	223.0	174.2	223.8	174.8	224.6	175.5	225.4	176.1	226.2	176.7	226.9	177.3	52	
	39	219.9	178.1	220.7	178.7	221.6	179.4	222.3	180.0	223.0	180.6	223.8	181.2	51	
	..	218.8	179.5	219.5	180.2	220.3	180.8	221.1	181.4	221.8	182.1	222.6	182.7	..	$4\frac{1}{2}$
	40	216.8	181.9	217.6	182.6	218.3	183.2	219.1	183.8	219.9	184.5	220.6	185.1	50	
	41	213.6	185.7	214.3	186.3	215.1	187.0	215.8	187.6	216.6	188.3	217.4	188.9	49	
	42	210.3	189.4	211.1	190.0	211.8	190.7	212.5	191.4	213.3	192.0	214.0	192.7	48	
	..	209.7	190.0	210.4	190.7	211.2	191.4	211.9	192.1	212.6	192.7	213.4	193.4	..	$4\frac{1}{4}$
	43	207.0	193.0	207.7	193.7	208.4	194.4	209.2	195.1	209.9	195.7	210.6	196.4	47	
	44	203.6	196.6	204.3	197.3	205.0	198.0	205.7	198.7	206.5	199.4	207.2	200.1	46	
4	45	200.1	200.1	200.8	200.8	201.5	201.5	202.2	202.2	202.9	202.9	203.6	203.6	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		283		284		285		286		287		288			Rumos

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Rumos		Distancia												Rumos	
		289		290		291		292		293		294			
Pt.	Gr.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Gr.	Pt.
	1	289.0	5.0	290.0	5.1	291.0	5.1	292.0	5.1	293.0	5.1	294.0	5.1	89	
¼	2	288.8	10.1	289.8	10.1	290.8	10.2	291.8	10.2	292.8	10.2	293.8	10.3	88	
	..	288.7	14.2	289.7	14.2	290.7	14.3	291.7	14.3	292.7	14.4	293 6	14.4	..	7¾
	3	288.6	15.1	289.6	15.2	290.6	15.2	291.6	15.3	292 6	15.3	293.6	15.4	87	
	4	288.3	20.2	289.3	20.2	290.3	20.3	291.3	20.4	292.3	20.4	293.3	20.5	86	
	5	287.9	25.2	288.9	25.3	289.9	25.4	290.9	25.4	291.9	25.5	292.9	25.6	85	
½	..	287.6	28.3	288.6	28.4	289.6	28.5	290.6	28.6	291.6	28.7	292.6	28.8	..	7½
	6	287.4	30.2	288.4	30.3	289.4	30.4	290.4	30.5	291.4	30.6	292.4	30.7	84	
	7	286.8	35.2	287.8	35.3	288.8	35.5	289.8	35.6	290.8	35.7	291.8	35.8	83	
	8	286.2	40.2	287.2	40.4	288.2	40.5	289.2	40.6	290.1	40.8	291.1	40.9	82	
¾	..	285.9	42.4	286.9	42.6	287.9	42.7	288.8	42.8	289.8	43.0	290.8	43.1	..	7¼
	9	285.4	45.2	286.4	45.4	287.4	45.5	288.4	45.7	289.4	45.8	290.4	46.0	81	
	10	284.6	50.2	285.6	50.4	286.6	50.5	287.6	50.7	288.5	50.9	289.5	51.1	80	
	11	283.7	55.1	284.7	55.3	285.7	55.5	286.6	55.7	287.6	55.9	288.6	56.1	79	
1	..	283.4	56.4	284.4	56.6	285.4	56.8	286.4	57.0	287.4	57.2	288.3	57.4	..	7
	12	282.7	60.1	283.7	60.3	284.6	60.5	285.6	60.7	286.6	60.9	287.6	61.1	78	
	13	281.6	65.0	282.6	65.2	283.5	65.5	284.5	65.7	285.5	65.9	286.5	66.1	77	
	14	280.4	69.9	281.4	70.2	282.4	70.4	283.3	70.6	284.3	70.9	285.3	71.1	76	
1¼	..	280.3	70.2	281.3	70.5	282.3	70.7	283.3	71.0	284.2	71.2	285.2	71.4	..	6¾
	15	279.2	74.8	280.1	75.1	281.1	75.3	282.1	75.6	283.0	75.8	284.0	76.1	75	
	16	277.8	79.7	278.8	79.9	279.7	80.2	280.7	80.5	281.6	80.8	282.6	81.0	74	
1½	..	276.6	83.9	277.5	84.2	278.5	84.5	279.4	84.8	280.4	85.0	281.3	85.3	..	6½
	17	276.4	84.5	277.3	84.8	278.3	85.1	279.2	85.4	280.2	85.7	281.2	86.0	73	
	18	274.9	89.3	275.8	89.6	276.8	89.9	277.7	90.2	278.7	90.5	279.6	90.9	72	
	19	273.3	94.1	274.2	94.4	275.1	94.7	276.1	95.1	277.0	95.4	278.0	95.7	71	
1¾	..	272.1	97.4	273.0	97.7	274.0	98.0	274.9	98.4	275.9	98.7	276.8	99.0	..	6¼
	20	271 6	98.8	272.5	99.2	273.5	99.5	274.4	99.9	275.3	100.2	276.3	100.6	70	
	21	269.8	103.6	270.7	103.9	271.7	104.3	272.6	104.6	273.5	105 0	274.5	105.4	69	
	22	268 0	108.3	268.9	108.6	269.8	109.0	270.7	109.4	271.7	109.8	272.6	110.1	68	
2	..	267.0	110.6	267.9	111.0	268.9	111.4	269.8	111.7	270.7	112.1	271.6	112.5	..	6
	23	266.0	112.9	266.9	113.3	267.9	113.7	268.8	114.1	269.7	114.5	270.6	114.9	67	
	24	264.0	117.5	264.9	118.0	265.8	118.4	266.8	118.8	267.7	119.2	268.6	119.6	66	
	25	261.9	122.1	262.8	122.6	263.7	123.0	264.6	123.4	265.5	123.8	266.5	124.2	65	
2¼	..	261.3	123.6	262.2	124.0	263.1	124.4	264.0	124.9	264.9	125.3	265.8	125.7	..	5¾
	26	259.8	126.7	260.7	127.1	261.5	127.6	262.4	128.0	263.3	128.4	264.2	128.9	64	
	27	257.5	131.2	258.4	131.7	259.3	132.1	260.2	132.6	261.1	133.0	262.0	133.5	63	
	28	255.2	135.7	256.1	136.1	256.9	136.6	257.8	137.1	258.7	137.6	259.6	138.0	62	
2½	..	254.9	136.2	255.8	136.7	256.6	137.2	257.5	137.6	258.4	138.1	259.3	138.6	..	5½
	29	252.8	140.1	253.6	140.6	254.5	141.1	255.4	141.6	256.3	142.0	257.1	142.5	61	
	30	250.3	144.5	251.1	145.0	252.0	145.5	252.9	146.0	253.7	146.5	254.6	147.0	60	
2¾	..	247.9	148.6	248.7	149.1	249.6	149.6	250.5	150.1	251.3	150.6	252.2	151.1	..	5¼
	31	247.7	148.8	248.6	149.4	249.4	149.9	250.3	150.4	251.2	150.9	252.0	151.4	59	
	32	245.1	153.1	245.9	153.7	246.8	154.2	247.6	154.7	248.5	155.3	249 3	155.8	58	
	33	242.4	157.4	243.2	157.9	244.1	158.5	244.9	159.0	245.7	159.6	246.6	160.1	57	
3	..	240.3	160.6	241.1	161.1	242.0	161.7	242.8	162.2	243.6	162.8	244.4	163.3	..	5
	34	239.6	161.6	240.4	162.2	241.2	162.7	242.1	163.3	242.9	163.8	243.7	164.4	56	
	35	236.7	165.8	237.6	166.3	238.4	166.9	239.2	167.5	240.0	168.1	240.8	168.6	55	
	36	233.8	169.9	234.6	170.5	235.4	171.0	236.2	171.6	237.0	172.2	237.9	172.8	54	
3¼	..	232.1	172.2	232.9	172.8	233.7	173.3	234.5	173.9	235.3	174.5	236.1	175.1	..	4¾
	37	230.8	173.9	231.6	174.5	232.4	175.1	233.2	175.7	234.0	176.3	234.8	176.9	53	
	38	227.7	177.9	228.5	178.5	229.3	179.2	230.1	179.8	230.9	180.4	231.7	181.0	52	
	39	224.6	181.9	225.4	182.5	226.1	183.1	226.9	183.8	227.7	184.4	228.5	185.0	51	
3½	..	223.4	183.3	224.2	184.0	224.9	184.6	225.7	185.2	226.5	185.9	227.3	186.5	..	4½
	40	221.4	185.8	222.2	186.4	222.9	187.1	223.7	187.7	224.5	188.3	225.2	189.0	50	
	41	218.1	189.6	218.9	190.3	219.6	190.9	220.4	191.6	221.1	192.2	221.9	192.9	49	
	42	214.8	193.4	215.5	194.0	216.3	194.7	217.0	195.4	217.7	196.1	218.5	196.7	48	
3¾	..	214.1	194.1	214.9	194.7	215.6	195.4	216.4	196.1	217.1	196.8	217.8	197.4	..	4¼
	43	211.4	197.1	212.1	197.8	212.8	198.5	213.6	199.1	214.3	199.8	215.0	200.5	47	
	44	207.9	200.8	208.6	201.5	209.3	202.1	210.0	202.8	210.8	203.5	211.5	204.2	46	
4	45	204.4	204.4	205.1	205.1	205.8	205.8	206.5	206.5	207.2	207.2	207.9	207.9	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		289		290		291		292		293		294		Rumos	

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Estima

T. I)

Rumos Pt.	Gr.	Distancia 295 Lt.	295 Ap.	296 Lt.	296 Ap.	297 Lt.	297 Ap.	298 Lt.	298 Ap.	299 Lt.	299 Ap.	300 Lt.	300 Ap.	Rumos Gr.	Pt.
	1	295.0	5.1	296.0	5.2	297.0	5.2	298.0	5.2	299.0	5.2	300.0	5.2	89	
	2	294.8	10.3	295.8	10.3	296.8	10.4	297.8	10.4	298.8	10.4	299.8	10.5	88	
1/4	..	294.6	14.5	295.6	14.5	296.6	14.6	297.6	14.6	298.6	14.7	299.6	14.7	..	7 3/4
	3	294.6	15.4	295.6	15.5	296.6	15.5	297.6	15.6	298.6	15.6	299.6	15.7	87	
	4	294.3	20.6	295.3	20.6	296.3	20.7	297.3	20.8	298.3	20.9	299.3	20.9	86	
	5	293.9	25.7	294.9	25.8	295.9	25.9	296.9	26.0	297.9	26.1	298.9	26.1	85	
1/2	..	293.6	28.9	294.6	29.0	295.6	29.1	296.6	29.2	297.6	29.3	298.6	29.4	..	7 1/2
	6	293.4	30.8	294.4	30.9	295.4	31.0	296.4	31.1	297.4	31.3	298.4	31.4	84	
	7	292.8	36.0	293.8	36.1	294.8	36.2	295.8	36.3	296.8	36.4	297.8	36.6	83	
	8	292.1	41.1	293.1	41.2	294.1	41.3	295.1	41.5	296.1	41.6	297.1	41.8	82	
3/4	..	291.8	43.3	292.8	43.4	293.8	43.6	294.8	43.7	295.8	43.9	296.8	44.0	..	7 1/4
	9	291.4	46.1	292.4	46.3	293.3	46.5	294.3	46.6	295.3	46.8	296.3	46.9	81	
	10	290.5	51.2	291.5	51.4	292.5	51.6	293.5	51.7	294.5	51.9	295.4	52.1	80	
	11	289.6	56.3	290.6	56.5	291.5	56.7	292.5	56.9	293.5	57.1	294.5	57.2	79	
1	..	289.3	57.6	290.3	57.7	291.3	57.9	292.3	58.1	293.3	58.3	294.2	58.5	..	7
	12	288.6	61.3	289.5	61.5	290.5	61.7	291.5	62.0	292.5	62.2	293.4	62.4	78	
	13	287.4	66.4	288.4	66.6	289.4	66.8	290.4	67.0	291.3	67.3	292.3	67.5	77	
	14	286.2	71.4	287.2	71.6	288.2	71.9	289.1	72.1	290.1	72.3	291.1	72.6	76	
1 1/4	..	286.2	71.7	287.1	71.9	288.1	72.2	289.1	72.4	290.1	72.7	291.0	72.9	..	6 3/4
	15	284.9	76.4	285.9	76.6	286.9	76.9	287.8	77.1	288.8	77.4	289.8	77.6	75	
	16	283.6	81.3	284.5	81.6	285.5	81.9	286.5	82.1	287.4	82.4	288.4	82.7	74	
1 1/2	..	282.3	85.6	283.3	85.9	284.2	86.2	285.2	86.5	286.1	86.8	287.1	87.1	..	6 1/2
	17	282.1	86.2	283.1	86.5	284.0	86.8	285.0	87.1	285.9	87.4	286.9	87.7	73	
	18	280.6	91.2	281.5	91.5	282.5	91.8	283.4	92.1	284.4	92.4	285.3	92.7	72	
	19	278.9	96.0	279.9	96.4	280.8	96.7	281.8	97.0	282.7	97.3	283.7	97.7	71	
1 3/4	..	277.7	99.4	278.7	99.7	279.6	100.1	280.6	100.4	281.5	100.7	282.5	101.1	..	6 1/4
	20	277.2	100.9	278.1	101.2	279.1	101.6	280.0	101.9	281.0	102.3	281.9	102.6	70	
	21	275.4	105.7	276.3	106.1	277.3	106.4	278.2	106.8	279.1	107.2	280.1	107.5	69	
	22	273.5	110.5	274.4	110.9	275.4	111.3	276.3	111.6	277.2	112.0	278.2	112.4	68	
2	..	272.5	112.9	273.5	113.3	274.4	113.7	275.3	114.0	276.2	114.4	277.2	114.8	..	6
	23	271.5	115.3	272.5	115.7	273.4	116.0	274.3	116.4	275.2	116.8	276.2	117.2	67	
	24	269.5	120.0	270.4	120.4	271.3	120.8	272.2	121.2	273.2	121.6	274.1	122.0	66	
	25	267.4	124.7	268.3	125.1	269.2	125.5	270.1	125.9	271.0	126.4	271.9	126.8	65	
2 1/4	..	266.7	126.1	267.6	126.6	268.5	127.0	269.4	127.4	270.3	127.9	271.2	128.3	..	5 3/4
	26	265.1	129.3	266.0	129.8	266.9	130.2	267.8	130.6	268.7	131.1	269.6	131.5	64	
	27	262.8	133.9	263.7	134.4	264.6	134.8	265.5	135.3	266.4	135.7	267.3	136.2	63	
	28	260.5	138.5	261.3	139.0	262.2	139.4	263.1	139.9	264.0	140.4	264.9	140.8	62	
2 1/2	..	260.2	139.1	261.1	139.5	261.9	140.0	262.8	140.5	263.7	140.9	264.6	141.4	..	5 1/2
	29	258.0	143.0	258.9	143.5	259.8	144.0	260.6	144.5	261.5	145.0	262.4	145.4	61	
	30	255.5	147.5	256.3	148.0	257.2	148.5	258.1	149.0	258.9	149.5	259.8	150.0	60	
2 3/4	..	253.0	151.7	253.9	152.2	254.7	152.7	255.6	153.2	256.5	153.7	257.3	154.2	..	5 1/4
	31	252.9	151.9	253.7	152.5	254.6	153.0	255.4	153.5	256.3	154.0	257.1	154.5	59	
	32	250.2	156.3	251.0	156.9	251.9	157.4	252.7	157.9	253.6	158.4	254.4	159.0	58	
	33	247.4	160.7	248.2	161.2	249.1	161.8	249.9	162.3	250.8	162.8	251.6	163.4	57	
3	..	245.3	163.9	246.1	164.4	246.9	165.0	247.8	165.6	248.6	166.1	249.4	166.7	..	5
	34	244.6	165.0	245.4	165.5	246.2	166.1	247.1	166.6	247.9	167.2	248.7	167.8	56	
	35	241.6	169.2	242.5	169.8	243.3	170.4	244.1	170.9	244.9	171.5	245.7	172.1	55	
	36	238.7	173.4	239.5	174.0	240.3	174.6	241.1	175.2	241.9	175.7	242.7	176.3	54	
3 1/4	..	236.9	175.7	237.7	176.3	238.5	176.9	239.4	177.5	240.2	178.1	241.0	178.7	..	4 3/4
	37	235.6	177.5	236.4	178.1	237.2	178.7	238.0	179.3	238.8	179.9	239.6	180.5	53	
	38	232.5	181.6	233.3	182.2	234.0	182.9	234.8	183.5	235.6	184.1	236.4	184.7	52	
	39	229.3	185.6	230.0	186.3	230.8	186.9	231.6	187.5	232.4	188.2	233.1	188.8	51	
3 1/2	..	228.0	187.1	228.8	187.8	229.6	188.4	230.4	189.0	231.1	189.7	231.9	190.3	..	4 1/2
	40	226.0	189.6	226.7	190.3	227.5	190.9	228.3	191.6	229.0	192.2	229.8	292.8	50	
	41	222.6	193.5	223.4	194.2	224.1	194.8	224.9	195.5	225.7	196.2	226.4	196.8	49	
	42	219.2	197.4	220.0	198.1	220.7	198.7	221.5	199.4	222.2	200.1	222.9	200.7	48	
3 3/4	..	218.6	198.1	219.3	198.8	220.1	199.4	220.8	200.1	221.5	200.8	222.3	201.5	..	4 1/4
	43	215.7	201.2	216.5	201.9	217.2	202.6	217.9	203.2	218.7	203.9	219.4	204.6	47	
	44	212.2	204.9	212.9	205.6	213.6	206.3	214.4	207.0	215.1	207.7	215.8	208.4	46	
4	45	208.6	208.6	209.3	209.3	210.0	210.0	210.7	210.7	211.4	211.4	212.1	212.1	45	4
Pt.	Gr.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Ap.	Lt.	Gr.	Pt.
Rumos		295		296		297		298		299		300		Rumos	

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Diff. de Lat. e Ap. T. 2)

Rumo Pt.	Rumo Gr.	Factores da dist. para Lt.	Factores da dist. para Ap.	Rumo Gr.	Rumo Pt.
	1	1.000	0.017	89	
	2	0.999	0.035	88	
¼	..	0.999	0.049	..	7¾
	3	0.999	0.052	87	
	4	0.998	0.070	86	
	5	0.996	0.087	85	
½	..	0.995	0.098	..	7½
	6	0.995	0.105	84	
	7	0.993	0.122	83	
	8	0.990	0.139	82	
¾	..	0.989	0.147	..	7¼
	9	0.988	0.156	81	
	10	0.985	0.174	80	
	11	0.982	0.191	79	
1	..	0.981	0.195	..	7
	12	0.978	0.208	78	
	13	0.974	0.225	77	
	14	0.970	0.242	76	
1¼	..	0.970	0.243	..	6¾
	15	0.966	0.259	75	
	16	0.961	0.276	74	
1½	..	0.957	0.290	..	6½
	17	0.956	0.292	73	
	18	0.951	0.309	72	
	19	0.946	0.326	71	
1¾	..	0.942	0.337	..	6¼
	20	0.940	0.342	70	
	21	0.934	0.358	69	
	22	0.927	0.375	68	
2	..	0.924	0.383	..	6
	23	0.920	0.391	67	
	24	0.914	0.407	66	
	25	0.906	0.423	65	
2¼	..	0.904	0.428	..	5¾
	26	0.899	0.438	64	
	27	0.891	0.454	63	
	28	0.883	0.469	62	
2½	..	0.882	0.471	..	5½
	29	0.875	0.485	61	
	30	0.866	0.500	60	
2¾	..	0.858	0.514	..	5¼
	31	0.857	0.515	59	
	32	0.848	0.530	58	
	33	0.839	0.545	57	
3	..	0.831	0.556	..	5
	34	0.829	0.559	56	
	35	0.819	0.574	55	
	36	0.809	0.588	54	
3¼	..	0.803	0.596	..	4¾
	37	0.799	0.602	53	
	38	0.788	0.616	52	
	39	0.777	0.629	51	
3½	..	0.773	0.634	..	4½
	40	0.766	0.643	50	
	41	0.755	0.656	49	
	42	0.743	0.669	48	
3¾	..	0.741	0.671	..	4¼
	43	0.731	0.682	47	
	44	0.719	0.695	46	
4	45	0.707	0.707	45	4
Pt.	Gr.	Ap.	Lt.	Gr.	Pt.

Diff. de Long. T. 2-a)

Lat. media	Factor do Ap.
10	1.015
11	1.019
12	1.022
13	1.026
14	1.031
15	1.035
16	1.040
17	1.046
18	1.051
19	1.058
20	1.064
21	1.071
22	1.079
23	1.086
24	1.095
25	1.103
26	1.113
27	1.122
28	1.133
29	1.143
30	1.155
31	1.167
32	1.179
33	1.192
34	1.206
35	1.221
36	1.236
37	1.252
38	1.269
39	1.287
40	1.305
41	1.325
42	1.346
43	1.367
44	1.390
45	1.414
46	1.440
47	1.466
48	1.494
49	1.524
50	1.556
51	1.589
52	1.624
53	1.662
54	1.701
55	1.743
56	1.788
57	1.836
58	1.887
59	1.942
60	2.000
61	2.063
62	2.130
63	2.203
64	2.281
65	2.366
66	2.459
67	2.559
68	2.669
69	2.790
70	2.924
—	—

Refracção media T. 3)

Alt. app.	R.	Alt. app.	R.	Alt. app.	R.
° ′	″ ′	° ′	′ ″	° ′	′ ″
0 00	33 48	11 00	4 52	37 00	1 17
10	31 51	20	4 43	30	1 16
20	30 10	40	4 36	38 00	1 15
30	28 33	12 00	4 28	30	1 14
40	27 02	20	4 21	39 00	1 12
50	25 39	40	4 14	30	1 11
1 00	24 22	13 00	4 08	40 00	1 09
10	23 10	20	4 01	30	1 08
20	22 04	40	3 56	41 00	1 07
30	21 02	14 00	3 50	30	1 06
40	20 05	20	3 45	42 00	1 05
50	19 12	40	3 39	30	1 04
2 00	18 23	15 00	3 34	43 00	1 02
10	17 37	20	3 30	30	1 01
20	16 54	40	3 25	44 00	1 00
30	16 14	16 00	3 21	30	0 59
40	15 36	20	3 16	45 00	0 58
50	15 01	40	3 12	30	0 57
3 00	14 28	17 00	3 09	46 00	0 56
10	13 58	20	3 05	47 00	0 54
20	13 29	40	3 01	48 00	0 52
30	13 01	18 00	2 58	49 00	0 51
40	12 36	20	2 54	50 00	0 50
50	12 11	40	2 51	51 00	0 47
4 00	11 49	19 00	2 48	52 00	0 46
10	11 27	20	2 45	53 00	0 44
20	11 06	40	2 42	54 00	0 42
30	10 47	20 00	2 39	55 00	0 41
40	10 29	20	2 36	56 00	0 39
50	10 11	40	2 33	57 00	0 38
5 00	9 55	21 00	2 31	58 00	0 36
10	9 39	30	2 27	59 00	0 35
20	9 24	22 00	2 23	60 00	0 34
30	9 09	30	2 20	61 00	0 32
40	8 56	23 00	2 17	62 00	0 31
50	8 43	30	2 13	63 00	0 30
6 00	8 30	24 00	2 10	64 00	0 28
10	8 18	30	2 07	65 00	0 27
20	8 07	25 00	2 04	66 00	0 26
30	7 56	30	2 02	67 00	0 25
40	7 45	26 00	1 59	68 00	0 24
50	7 35	30	1 56	69 00	0 22
7 00	7 25	27 00	1 54	70 00	0 21
10	7 16	30	1 52	71 00	0 20
20	7 07	28 00	1 49	72 00	0 19
30	6 59	30	1 47	73 00	0 18
40	6 50	29 00	1 45	74 00	0 17
50	6 42	30	1 43	75 00	0 16
8 00	6 35	30 00	1 41	76 00	0 15
10	6 27	30	1 39	77 00	0 13
20	6 20	31 00	1 37	78 00	0 12
30	6 13	30	1 35	79 00	0 11
40	6 06	32 00	1 33	80 00	0 10
50	6 00	30	1 31	81 00	0 09
9 00	5 54	33 00	1 30	82 00	0 08
10	5 48	30	1 28	83 00	0 07
20	5 42	34 00	1 26	84 00	0 06
30	5 36	30	1 25	85 00	0 05
40	5 30	35 00	1 23	86 00	0 04
50	5 25	30	1 22	87 00	0 03
10 00	5 20	36 00	1 20	88 00	0 02
20	5 10	30	1 19	89 00	0 01
40	5 01	37 00	1 17	90 00	0 00

Depressão media T. 4)

Elevação (metros)	Dep.	Elevação (metros)	Dep.
	′ ″		′ ″
0.4	1 07	8.0	5 01
6	1 22	9.0	5 19
8	1 35	10.0	5 36
1.0	1 46	20.0	7 56
2	1 57	25.0	8 52
4	2 06	30.0	9 43
6	2 15	35.0	10 29
8	2 23	40.0	11 13
2.0	2 30	50.0	12 32
2	2 38		
4	2 45		
6	2 51		
8	2 58		
3.0	3 04		
2	3 10		
4	3 16		
6	3 22		
8	3 27		
4.0	3 33		
2	3 38		
4	3 43		
6	3 48		
8	3 53		
5.0	3 58		
2	4 03		
4	4 07		
6	4 12		
8	4 16		
6.0	4 21		
2	4 25		
4	4 29		
6	4 33		
8	4 37		
7.0	4 41		
2	4 45		
4	4 49		
6	4 53		
8	4 57		

Parall. em alt. do Sol T. 6)

Alt.	Parall.
°	″
0	9
6	9
12	9
16	8
20	8
25	8
30	8
34	7
36	7
40	7
45	6
48	6
51	5
54	5
57	5
60	4
63	4
66	3
69	3
72	3
75	2
78	2
81	1
84	1
87	0

Depr. a differentes dist. do observador T. 5)

Milhas	1.° termo	2.° termo
	′ ″	″
0.25	0 6.3	445.5
0.50	0 12.6	222.7
0.75	0 18.9	148.5
1.00	0 25.2	111.4
1.25	0 31.5	89.1
1.50	0 37.8	74.2
1.75	0 44.1	63.6
2.00	0 50.4	55.7
2.25	0 56.7	49.5
2.50	1 3.0	44.5
2.75	1 9.3	40.5
3.00	1 15.6	37.1
3.50	1 28.2	31.8
4.00	1 40.8	27.8
4.50	1 53.4	24.7
5.00	2 6.0	22.3
5.50	2 18.6	20.2
6.00	2 31.2	18.6

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Augmento do ½ Diametro horizontal ☾ T. 7)

Alt. app.	Semi-diametro horizontal 14′ 30″	15′ 0″	15′ 30″	16′ 0″	16′ 30″	17′ 0″
0	″	″	″	″	″	″
0	0.1	0.1	0.1	0.1	0.1	0.1
2	0.6	0.6	0.7	0.7	0.8	0.8
4	1.0	1.1	1.2	1.3	1.4	1.5
6	1.5	1.6	1.7	1.9	2.0	2.1
8	2.0	2.1	2.2	2.4	2.5	2.7
10	2.4	2.7	2.8	3.0	3.2	3.3
12	2.9	3.2	3.3	3.5	3.7	4.0
14	3.4	3.6	3.8	4.1	4.4	4.6
16	3.9	4.1	4.4	4.7	5.0	5.2
18	4.3	4.6	4.9	5.2	5.5	5.9
21	4.9	5.3	5.7	6.0	6.4	6.7
24	5.6	6.0	6.4	6.8	7.2	7.7
27	6.2	6.7	7.2	7.6	8.1	8.6
30	6.9	7.4	7.9	8.4	8.9	9.4
33	7.5	8.0	8.6	9.1	9.6	10.3
36	8.0	8.6	9.2	9.8	10.4	11.1
39	8.6	9.2	9.9	10.5	11.1	11.8
42	9.1	9.8	10.4	11.2	11.8	12.6
45	9.7	10.3	11.0	11.8	12.5	13.3
48	10.2	10.9	11.6	12.4	13.1	14.0
51	10.6	11.3	12.1	12.9	13.7	14.6
54	11.1	11.8	12.6	13.5	14.3	15.2
57	11.5	12.3	13.1	14.0	14.8	15.7
63	12.2	13.0	13.9	14.8	15.7	16.7
70	12.7	13.7	14.7	15.7	16.6	17.6
78	13.3	14.3	15.3	16.3	17.3	18.4
90	13.5	14.6	15.6	16.7	17.6	18.6

Diminuição da Parallaxe equatorial T. 8)

Latitude	Parallaxe equatorial 54′	56′	58′	60′	62′
0	′	″	″	″	″
0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0
6	0.1	0.1	0.1	0.1	0.1
9	0.3	0.3	0.3	0.3	0.3
12	0.5	0.5	0.5	0.5	0.5
15	0.7	0.7	0.8	0.8	0.8
18	1.0	1.1	1.1	1.1	1.2
21	1.4	1.4	1.5	1.5	1.6
24	1.8	1.8	1.9	1.9	2.0
27	2.2	2.3	2.4	2.4	2.5
30	2.6	2.8	2.8	2.9	3.1
33	3.1	3.3	3.3	3.5	3.6
36	3.7	3.9	3.9	4.1	4.2
39	4.2	4.4	4.5	4.7	4.8
42	4.7	4.9	5.1	5.3	5.5
45	5.3	5.5	5.7	5.9	6.1
48	5.8	6.1	6.3	6.5	6.7
51	6.4	6.7	6.9	7.1	7.4
54	6.9	7.2	7.5	7.7	8.0
57	7.4	7.8	8.0	8.3	8.6
60	7.9	8.3	8.6	8.8	9.1
63	8.4	8.7	9.1	9.3	9.7
66	8.8	9.2	9.5	9.8	10.2
69	9.2	9.6	9.9	10.2	10.6
72	9.6	10.0	10.3	10.6	11.0
75	9.9	10.3	10.6	11.0	11.4

Parallaxe em altura dos Planetas T. 9)

Alt. app.	Parallaxe horizontal 1″	3″	5″	7″	9″	11″	13″	15″	17″	19″	21″	23″	25″	27″	29″	31″	33″	Alt. app.
0																		
3	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	3
4	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	4
5	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	5
6	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	6
7	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	7
8	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	8
9	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	9
10	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	32	10
11	1	3	5	7	9	11	13	15	17	19	21	23	25	26	28	30	32	11
12	1	3	5	7	9	11	13	15	17	19	21	22	24	26	28	30	32	12
14	1	3	5	7	9	11	13	15	16	18	20	22	24	26	28	30	32	14
16	1	3	5	7	9	11	12	14	16	18	20	22	24	26	28	30	32	16
18	1	3	5	7	9	10	12	14	16	18	20	22	24	26	28	29	31	18
20	1	3	5	7	8	10	12	14	16	18	20	22	24	25	27	29	31	20
23	1	3	5	6	8	10	12	14	16	17	19	21	23	25	27	29	30	23
26	1	3	4	6	8	10	12	13	15	17	19	21	22	24	26	28	30	26
29	1	3	4	6	8	10	11	13	15	17	18	20	22	24	25	27	29	29
32	1	2	4	6	8	9	11	13	14	16	18	19	21	23	25	26	28	32
35	1	2	4	6	7	9	11	12	14	16	17	19	20	22	24	25	27	35
40	1	2	4	5	7	8	10	12	13	15	16	18	19	21	22	24	25	40
45	1	2	3	5	6	8	9	11	12	13	15	16	18	19	21	22	23	45
50	1	2	3	5	6	7	8	10	11	12	13	15	16	17	19	20	21	50
55	1	2	3	4	5	6	7	9	10	11	12	13	14	15	17	18	19	55
60	0	2	3	4	5	5	6	7	8	9	10	11	12	13	14	15	16	60
65	0	1	2	3	4	5	5	6	7	8	9	10	11	11	12	13	14	65
70	0	1	2	2	3	4	4	5	6	6	7	8	9	9	10	11	11	70
75	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	75
80	0	0	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	80
85	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	85
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90

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Correcção da Altura observada do Sol (limbo inferior)

T. 10)

Alt. obs.	Elevação (metros) 1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	7	8	9	10	11	12	Alt. obs.
° ′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	° ′
8	7.8	7.4	7.1	6.8	6.6	6.4	6.1	5.9	5.7	5.5	5.3	5.0	4.7	4.4	4.1	3.8	3.6	8
8 20	8.1	7.7	7.4	7.1	6.8	6.6	6.4	6.1	5.9	5.7	5.6	5.3	4.9	4.6	4.4	4.1	3.8	8 20
8 40	8.3	7.9	7.6	7.3	7.1	6.8	6.6	6.4	6.2	6.0	5.8	5.5	5.2	4.9	4.6	4.3	4.1	8 40
9	8.5	8.1	7.8	7.5	7.3	7.0	6.8	6.6	6.4	6.2	6.0	5.7	5.4	5.1	4.8	4.5	4.3	9
9 20	8.7	8.3	8.0	7.7	7.5	7.3	7.0	6.8	6.6	6.4	6.2	5.9	5.6	5.3	5.0	4.7	4.5	9 20
9 40	8.9	8.5	8.2	7.9	7.7	7.4	7.2	7.0	6.8	6.6	6.4	6.1	5.8	5.5	5.2	4.9	4.7	9 40
10	9.1	8.7	8.4	8.1	7.8	7.6	7.4	7.1	6.9	6.7	6.6	6.2	5.9	5.6	5.4	5.1	4.8	10
10 30	9.3	8.9	8.6	8.3	8.1	7.8	7.6	7.4	7.2	7.0	6.8	6.5	6.2	5.9	5.6	5.3	5.1	10 30
11	9.5	9.1	8.8	8.5	8.3	8.0	7.8	7.6	7.4	7.2	7.0	6.7	6.4	6.1	5.8	5.6	5.3	11
11 30	9.7	9.3	9.0	8.8	8.5	8.3	8.0	7.8	7.6	7.4	7.2	6.9	6.6	6.3	6.0	5.8	5.6	11 30
12	9.9	9.5	9.2	8.9	8.7	8.5	8.2	8.0	7.8	7.6	7.4	7.1	6.8	6.5	6.2	6.0	5.7	12
13	10.3	9.8	9.6	9.3	9.0	8.8	8.5	8.3	8.1	7.9	7.8	7.4	7.1	6.8	6.5	6.3	6.0	13
14	10.6	10.1	9.9	9.6	9.3	9.1	8.8	8.6	8.4	8.2	8.1	7.7	7.4	7.1	6.8	6.6	6.3	14
15	10.8	10.4	10.1	9.8	9.6	9.4	9.1	8.9	8.7	8.5	8.3	8.0	7.7	7.4	7.1	6.9	6.6	15
16	11.1	10.6	10.3	10.1	9.8	9.6	9.3	9.1	8.9	8.7	8.5	8.2	7.9	7.6	7.3	7.0	6.8	16
17	11.3	10.8	10.5	10.3	10.0	9.8	9.5	9.3	9.1	8.9	8.8	8.4	8.1	7.8	7.5	7.3	7.0	17
18	11.4	11.0	10.7	10.4	10.2	10.0	9.7	9.5	9.3	9.1	8.9	8.6	8.3	8.0	7.7	7.5	7.2	18
19	11.6	11.2	10.9	10.6	10.4	10.1	9.9	9.7	9.5	9.3	9.1	8.8	8.5	8.2	7.9	7.6	7.3	19
20	11.8	11.3	11.0	10.8	10.5	10.3	10.0	9.8	9.6	9.4	9.3	8.9	8.6	8.3	8.0	7.8	7.5	20
22	12.0	11.6	11.3	11.0	10.8	10.5	10.3	10.1	9.9	9.7	9.5	9.2	8.9	8.6	8.3	8.0	7.8	22
24	12.2	11.8	11.5	11.2	11.0	10.8	10.5	10.3	10.1	9.9	9.7	9.4	9.1	8.8	8.5	8.2	8.0	24
26	12.4	12.0	11.7	11.4	11.2	10.9	10.7	10.5	10.3	10.1	9.9	9.6	9.3	9.0	8.7	8.4	8.2	26
28	12.6	12.2	11.9	11.6	11.3	11.1	10.9	10.7	10.5	10.3	10.1	9.8	9.4	9.1	8.9	8.6	8.3	28
30	12.7	12.3	12.0	11.7	11.4	11.2	11.0	10.8	10.6	10.4	10.2	9.9	9.6	9.3	9.0	8.7	8.4	30
32	12.8	12.4	12.1	11.8	11.6	11.4	11.1	10.9	10.7	10.5	10.3	10.0	9.7	9.4	9.1	8.8	8.6	32
34	12.9	12.5	12.2	11.9	11.7	11.5	11.2	11.0	10.8	10.6	10.4	10.1	9.8	9.5	9.2	8.9	8.7	34
36	13.0	12.6	12.3	12.0	11.8	11.6	11.3	11.1	10.9	10.7	10.5	10.2	9.9	9.6	9.3	9.1	8.8	36
38	13.1	12.7	12.4	12.1	11.9	11.7	11.4	11.2	11.0	10.8	10.6	10.3	10.0	9.7	9.4	9.2	8.9	38
40	13.2	12.8	12.5	12.2	12.0	11.8	11.5	11.3	11.1	10.9	10.7	10.4	10.1	9.8	9.5	9.3	9.0	40
42	13.3	12.9	12.6	12.3	12.0	11.8	11.6	11.4	11.2	11.0	10.8	10.5	10.1	9.8	9.6	9.3	9.0	42
44	13.4	13.0	12.7	12.4	12.1	11.9	11.7	11.4	11.2	11.0	10.9	10.5	10.2	9.9	9.7	9.4	9.1	44
46	13.4	13.0	12.7	12.4	12.2	12.0	11.7	11.5	11.3	11.1	10.9	10.6	10.3	10.0	9.7	9.4	9.2	46
48	13.5	13.1	12.8	12.5	12.3	12.0	11.8	11.6	11.4	11.2	11.0	10.7	10.3	10.0	9.8	9.5	9.3	48
50	13.6	13.1	12.8	12.6	12.3	12.1	11.8	11.6	11.4	11.2	11.0	10.7	10.4	10.1	9.8	9.6	9.3	50
55	13.7	13.3	12.9	12.7	12.4	12.2	12.0	11.7	11.5	11.3	11.2	10.8	10.5	10.2	9.9	9.7	9.4	55
60	13.8	13.4	13.0	12.8	12.5	12.3	12.0	11.8	11.6	11.4	11.3	10.9	10.6	10.3	10.0	9.8	9.5	60
65	13.9	13.5	13.2	12.9	12.6	12.4	12.2	11.9	11.8	11.6	11.4	11.0	10.7	10.4	10.2	9.9	9.6	65
70	14.0	13.5	13.2	13.0	12.7	12.5	12.2	12.0	11.8	11.6	11.5	11.1	10.8	10.5	10.2	10.0	9.7	70
75	14.0	13.6	13.3	13.0	12.8	12.6	12.3	12.1	11.9	11.7	11.5	11.2	10.9	10.6	10.3	10.1	9.8	75
80	14.1	13.7	13.4	13.1	12.9	12.7	12.4	12.2	12.0	11.8	11.6	11.3	11.0	10.7	10.4	10.1	9.9	80
85	14.2	13.8	13.5	13.2	13.0	12.7	12.4	12.3	12.1	11.9	11.7	11.4	11.0	10.8	10.5	10.2	9.9	85
90	14.3	13.8	13.5	13.3	13.0	12.8	12.5	12.3	12.1	11.9	11.8	11.4	11.1	10.8	10.5	10.3	10.0	90

Modificação á correcção por effeito da variação do semi-diametro

Janeiro	+ 0.3	Julho	— 0.2
Fevereiro	+ 0.2	Agosto	— 0.2
Março	+ 0.1	Setembro, 1 a 15	— 0.1
Abril, 1 a 15	± 0	Setembro, 16 a 30	± 0
Abril, 16 a 30	— 0.1	Outubro	+ 0.1
Maio, 1 a 15	— 0.1	Novembro	+ 0.2
Maio, 16 a 31	— 0.2	Dezembro	+ 0.3
Junho	— 0.2		

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T. II) Conversão de arco em tempo

°	h. m.	°	h. m.	°	h. m.	′	m. s.	″	s.
1	0 04	61	4 04	121	8 04	1	0 04	1	0.07
2	0 08	62	4 08	122	8 08	2	0 08	2	0.13
3	0 12	63	4 12	123	8 12	3	0 12	3	0.20
4	0 16	64	4 16	124	8 16	4	0 16	4	0.27
5	0 20	65	4 20	125	8 20	5	0 20	5	0.33
6	0 24	66	4 24	126	8 24	6	0 24	6	0.40
7	0 28	67	4 28	127	8 28	7	0 28	7	0 47
8	0 32	68	4 32	128	8 32	8	0 32	8	0.53
9	0 36	69	4 36	129	8 36	9	0 36	9	0.60
10	0 40	70	4 40	130	8 40	10	0 40	10	0.67
11	0 44	71	4 44	131	8 44	11	0 44	11	0.73
12	0 48	72	4 48	132	8 48	12	0 48	12	6.80
13	0 52	73	4 52	133	8 52	13	0 52	13	0.87
14	0 56	74	4 56	134	8 56	14	0 56	14	0.93
15	1 00	75	5 00	135	9 00	15	1 00	15	1.00
16	1 04	76	5 04	136	9 04	16	1 04	16	1.07
17	1 08	77	5 08	137	9 08	17	1 08	17	1.13
18	1 12	78	5 12	138	9 12	18	1 12	18	1.20
19	1 16	79	5 16	139	9 16	19	1 16	19	1.27
20	1 20	80	5 20	140	9 20	20	1 20	20	1.33
21	1 24	81	5 24	141	9 24	21	1 24	21	1.40
22	1 28	82	5 28	142	9 28	22	1 28	22	1.47
23	1 32	83	5 32	143	9 32	23	1 32	23	1.53
24	1 36	84	5 36	144	9 36	24	1 36	24	1.60
25	1 40	85	5 40	145	9 40	25	1 40	25	1.67
26	1 44	86	5 44	146	9 44	26	1 44	26	1.73
27	1 48	87	5 48	147	9 48	27	1 48	27	1.80
28	1 52	88	5 52	148	9 52	28	1 52	28	1.87
29	1 56	89	5 56	149	9 56	29	1 56	29	1.93
30	2 00	90	6 00	150	10 00	30	2 00	30	2.00
31	2 04	91	6 04	151	10 04	31	2 04	31	2.07
32	2 08	92	6 08	152	10 08	32	2 08	32	2.13
33	2 12	93	6 12	153	10 12	33	2 12	33	2.20
34	2 16	94	6 16	154	10 16	34	2 16	34	2.27
35	2 20	95	6 20	155	10 20	35	2 20	35	2.33
36	2 24	96	6 24	156	10 24	36	2 24	36	2.40
37	2 28	97	6 28	157	10 28	37	2 28	37	2.47
38	2 32	98	6 32	158	10 32	38	2 32	38	2.53
39	2 36	99	6 36	159	10 36	39	2 36	39	2.60
40	2 40	100	6 40	160	10 40	40	2 40	40	2.67
41	2 44	101	6 44	161	10 44	41	2 44	41	2.73
42	2 48	102	6 48	162	10 48	42	2 48	42	2.80
43	2 52	103	6 52	163	10 52	43	2 52	43	2.87
44	2 56	104	6 56	164	10 56	44	2 56	44	2.93
45	3 00	105	7 00	165	11 00	45	3 00	45	3.00
46	3 04	106	7 04	166	11 04	46	3 04	46	3.07
47	3 08	107	7 08	167	11 08	47	3 08	47	3.13
48	3 12	108	7 12	168	11 12	48	3 12	48	3.20
49	3 16	109	7 16	169	11 16	49	3 16	49	3.27
50	3 20	110	7 20	170	11 20	50	3 20	50	3.33
51	3 24	111	7 24	171	11 24	51	3 24	51	3.40
52	3 28	112	7 28	172	11 28	52	3 28	52	3.47
53	3 32	113	7 32	173	11 32	53	3 32	53	3.53
54	3 36	114	7 36	174	11 36	54	3 36	54	3.60
55	3 40	115	7 40	175	11 40	55	3 40	55	3.67
56	3 44	116	7 44	176	11 44	56	3 44	56	3.73
57	3 48	117	7 48	177	11 48	57	3 48	57	3.80
58	3 52	118	7 52	178	11 52	58	3 52	58	3.87
59	3 56	119	7 56	179	11 56	59	3 56	59	3.93
60	4 00	120	8 00	180	12 00	60	4 00	60	4.00

Conversão de tempo em arco

h.	°	m.	° ′	s.	′ ″	s.	″
1	15	1	0 15	1	0 15	0.01	0.15
2	30	2	0 30	2	0 30	0.02	0.30
3	45	3	0 45	3	0 45	0.03	0.45
4	60	4	1 00	4	1 00	0.04	0.60
5	75	5	1 15	5	1 15	0.05	0.75
6	90	6	1 30	6	1 30	0.06	0.90
7	105	7	1 45	7	1 45	0.07	1.05
8	120	8	2 00	8	2 00	0.08	1.20
9	135	9	2 15	9	2 15	0.09	1.35
10	150	10	2 30	10	2 30	0.10	1.50
11	165	11	2 45	11	2 45	0.11	1.65
12	180	12	3 00	12	3 00	0.12	1.80
13	195	13	3 15	13	3 15	0.13	1.95
14	210	14	3 30	14	3 30	0.14	2.10
15	225	15	3 45	15	3 45	0.15	2.25
16	240	16	4 00	16	4 00	0.16	2.40
17	255	17	4 15	17	4 15	0.17	.255
18	270	18	4 30	18	4 30	0.18	2.70
19	285	19	4 45	19	4 45	0.19	2.85
20	300	20	5 00	20	5 00	0.20	3.00
21	315	21	5 15	21	5 15	0.30	4.50
22	330	22	5 30	22	5 30	0.40	6.00
23	345	23	5 45	23	5 45	0.50	7.50
24	360	24	6 00	24	6 00	0.60	9.00
		25	6 15	25	6 15	0.70	10.50
		26	6 30	26	6 30	0.80	12.00
		27	6 45	27	6 45	0.90	13.50
		28	7 00	28	7 00	1.00	15.00
		29	7 15	29	7 15		
		30	7 30	30	7 30		
		31	7 45	31	7 45		
		32	8 00	32	8 00		
		33	8 15	33	8 15		
		34	8 30	34	8 30		
		35	8 45	35	8 45		
		36	9 00	36	9 00		
		37	9 15	37	9 15		
		38	9 30	38	9 30		
		39	9 45	39	9 45		
		40	10 00	40	10 00		
		41	10 15	41	10 15		
		42	10 30	42	10 30		
		43	10 45	43	10 45		
		44	11 00	44	11 00		
		45	11 15	45	11 15		
		46	11 30	46	11 30		
		47	11 45	47	11 45		
		48	12 00	48	12 00		
		49	12 15	49	12 15		
		50	12 30	50	12 30		
		51	12 45	51	12 45		
		52	13 00	52	13 00		
		53	13 15	53	13 15		
		54	13 30	54	13 30		
		55	13 45	55	13 45		
		56	14 00	56	14 00		
		57	14 15	57	14 15		
		58	14 30	58	14 30		
		59	14 45	59	14 45		
		60	15 00	60	15 00		

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Angulo horario de um Astro e Altura, no instante favoravel para a determinação da Hora

T. 12)

Declinação do mesmo nome que a latitude

Latitude	1°		2°		3°		4°		5°		6°		7°		8°		Latitude
	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	
0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	0
1	0 0	90 0	4 0	30 0	4 42	19 29	5 2	14 29	5 14	11 33	5 22	9 37	5 27	8 14	5 31	7 12	1
2	4 0	30 0	0 0	90 0	3 13	41 49	4 0	30 1	4 26	23 36	4 42	19 30	4 54	16 38	2	14 31	2
3	42	19 29	3 13	41 49	0 0	90 0	2 46	48 37	3 33	36 54	0	30 3	19	25 26	4 32	22 5	3
4	5 2	14 29	4 0	30 1	2 46	48 37	0 0	90 0	2 28	53 10	3 13	41 52	3 41	34 55	1	30 5	4
5	5 14	11 33	4 26	23 36	3 33	36 54	2 28	53 10	0 0	90 0	2 15	56 30	2 58	45 39	3 26	38 46	5
6	22	9 37	42	19 30	4 0	30 3	3 13	41 52	2 15	56 30	0 0	90 0	5	59 4	2 46	48 41	6
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8	31	7 12	5 2	14 31	32	22 5	4 1	30 5	3 26	38 46	6	48 41	1 56	61 7	0 0	90 0	8
9	35	6 24	9	12 53	43	19 33	15	26 29	46	33 52	3 14	41 56	2 37	51 10	1 50	62 50	9
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22	50	2 40	40	5 21	30	8 2	20	10 44	10	13 27	5 0	16 12	49	18 59	39	21 49	22
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26	52	2 17	44	4 34	35	6 51	27	9 9	19	11 28	10	13 48	5 2	16 8	53	18 31	26
27	52	2 12	44	4 25	36	6 37	28	8 50	20	11 4	12	13 19	4	15 34	56	17 51	27
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41	55	1 31	51	3 3	46	4 35	42	6 6	37	7 38	32	9 10	28	10 42	23	12 15	41
42	56	1 30	51	2 59	47	4 29	42	5 59	38	7 29	33	8 59	29	10 30	24	12 0	42
43	56	1 28	51	2 56	47	4 24	43	5 52	38	7 21	34	8 49	30	10 18	25	11 47	43
44	56	1 26	52	2 53	48	4 19	43	5 46	39	7 12	35	8 39	31	10 6	27	11 35	44
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62	58	1 8	56	2 16	54	3 23	51	4 31	49	5 39	47	6 47	45	7 55	43	9 3	62
64	58	1 7	56	2 14	54	3 20	52	4 27	50	5 34	48	6 41	46	7 48	44	8 54	64
66	58	1 6	56	2 11	55	3 17	53	4 23	51	5 28	49	6 34	47	7 40	46	8 46	66
68	58	1 5	57	2 9	55	3 14	54	4 19	52	5 24	50	6 28	49	7 33	47	8 38	68
70	59	1 4	57	2 8	56	3 12	54	4 15	53	5 19	51	6 23	50	7 27	48	8 31	70

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T. 12)

Declinação do mesmo nome que a latitude

Latitude	9°		10°		11°		12°		13°		14°		15°		16°		Latitude
	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	
o	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′	o
0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	0
1	5 35	6 24	5 37	5 46	5 39	5 15	5 41	4 49	5 43	4 27	5 44	4 8	5 45	3 52	5 46	3 38	1
2	9	12 53	14	11 36	19	10 32	22	9 40	25	8 56	28	8 18	30	7 45	32	7 16	2
3	4 43	19 33	4 51	17 32	4 57	15 55	3	14 35	8	13 27	11	12 30	15	11 40	18	10 57	3
4	15	26 29	27	23 41	36	21 27	4 43	19 36	4 49	18 4	4 55	16 45	4 59	15 38	4	14 40	4
5	3 46	33 52	4 1	30 8	4 13	27 11	4 23	24 47	4 31	22 48	4 38	21 7	4 44	19 41	4 49	18 26	5
6	14	41 56	3 34	37 1	3 49	33 13	1	30 11	12	27 41	20	25 36	28	23 49	34	22 17	6
7	2 37	51 10	3	44 34	23	39 42	3 39	35 53	3 51	32 48	2	30 15	11	28 5	19	26 14	7
8	1 50	62 56	2 29	53 16	2 55	46 50	14	42 1	30	38 13	3 43	35 7	3 53	32 32	3	30 20	8
9	0 0	90 0	1 44	64 16	22	55 4	2 47	48 48	7	44 4	22	40 17	35	37 11	3 46	34 35	9
10	1 44	64 16	0 0	90 0	1 40	65 31	2 16	56 38	2 41	50 32	3 0	45 52	3 15	42 8	3 28	39 3	10
11	2 22	55 4	1 40	65 31	0 0	90 0	1 35	66 36	11	58 1	2 35	52 14	2 54	47 30	9	43 48	11
12	47	48 48	2 16	56 38	1 35	66 36	0 0	90 0	1 32	67 33	6	59 15	30	53 27	2 49	48 58	12
13	3 7	44 4	41	50 32	2 11	58 1	1 32	67 33	0 0	90 0	1 29	68 25	2	60 22	26	54 42	13
14	22	40 17	3 0	45 52	35	52 4	2 6	59 15	1 29	68 25	0 0	90 0	1 26	69 11	1 58	61 22	14
15	3 35	37 11	3 15	42 8	2 54	47 30	2 30	53 27	2 2	60 22	1 26	69 11	0 0	90 0	1 23	69 53	15
16	46	34 35	28	39 3	3 9	43 48	49	48 58	26	54 42	58	61 22	1 23	69 53	0 0	90 0	16
17	55	32 21	39	36 26	22	40 44	3 4	45 20	44	50 18	2 21	55 50	55	62 17	1 21	70 31	17
18	4 3	30 25	49	34 11	33	38 46	17	42 17	59	46 43	40	51 32	2 18	56 53	52	63 7	18
19	10	28 43	57	32 14	43	35 53	28	39 41	3 12	43 42	54	48 0	36	52 39	2 14	57 51	19
20	4 17	27 13	4 4	30 31	3 51	33 55	3 37	37 26	3 23	41 8	3 7	45 1	2 50	49 11	2 32	53 42	20
21	23	25 53	11	28 59	58	32 10	46	35 28	32	38 53	18	42 28	3 3	46 14	47	50 17	21
22	28	24 41	16	27 37	4 5	30 37	53	33 43	41	36 54	28	40 14	14	43 42	59	47 22	22
23	32	23 36	22	26 23	11	29 14	4 0	32 9	48	35 9	36	38 15	23	41 29	3 10	44 52	23
24	37	22 37	27	25 16	16	27 59	6	30 45	55	33 35	44	36 30	32	39 31	20	42 40	24
25	4 41	21 43	4 31	24 16	4 21	26 50	4 12	29 28	4 1	32 10	3 51	34 55	3 40	37 46	3 28	40 43	25
26	44	20 54	35	23 20	26	25 48	17	28 19	7	30 52	57	33 30	47	36 11	36	38 58	26
27	48	20 9	39	22 29	30	24 51	21	27 15	12	29 42	4 3	32 12	53	34 45	43	37 23	27
28	51	19 28	43	21 42	34	23 59	26	26 17	17	28 38	8	31 1	59	33 27	49	35 57	28
29	54	18 49	46	20 59	38	23 11	30	25 24	22	27 39	13	29 56	4 4	32 16	55	34 39	29
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31	59	17 41	52	19 42	44	21 45	37	23 49	30	25 54	22	28 1	14	30 10	6	32 21	31
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33	4	16 42	57	18 36	50	20 30	44	22 26	37	24 24	30	26 22	23	28 22	15	30 24	33
34	6	16 15	59	18 5	53	19 57	47	21 50	40	23 43	33	25 38	26	27 34	19	29 32	34
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38	13	14 43	8	16 23	2	18 3	57	19 44	51	21 26	46	23 8	40	24 52	34	26 36	38
39	15	14 24	10	16 1	4	17 39	59	19 18	54	20 57	48	22 36	43	24 17	37	25 59	39
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41	18	13 48	13	15 21	8	16 55	3	18 29	58	20 3	53	21 38	48	23 14	43	24 51	41
42	19	13 31	15	15 2	10	16 34	5	18 0	5 1	19 39	56	21 12	51	22 45	46	24 20	42
43	21	13 16	16	14 45	12	16 15	7	17 45	3	19 10	58	20 47	53	22 18	48	23 50	43
44	22	13 1	18	14 29	14	15 57	9	17 25	5	18 54	5 0	20 23	56	21 53	51	23 23	44
45	5 24	12 47	5 19	14 13	5 15	15 39	5 11	17 6	5 7	18 33	5 2	20 0	4 58	21 28	4 53	22 57	45
46	25	12 34	21	13 58	17	15 23	13	16 48	8	18 13	4	19 39	5 0	21 5	56	22 32	46
47	26	12 21	22	13 44	18	15 8	14	16 31	10	17 55	6	19 19	2	20 44	58	22 8	47
48	27	12 9	23	13 31	20	14 53	16	16 15	12	17 37	8	19 0	4	20 23	5 0	21 46	48
49	28	11 58	25	13 18	21	14 39	17	15 59	14	17 20	10	18 42	6	20 3	2	21 25	49
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52	32	11 27	28	12 44	25	14 1	22	15 18	18	16 35	15	17 53	12	19 10	8	20 28	52
54	34	11 9	31	12 24	28	13 39	24	14 54	21	16 9	18	17 24	15	18 39	12	19 55	54
56	35	10 53	33	12 5	30	13 18	27	14 31	24	15 45	21	16 58	18	18 12	15	19 25	56
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64	42	10 1	40	11 8	38	12 15	36	13 23	34	14 30	32	15 37	30	16 44	28	17 52	64
66	44	9 52	42	10 57	40	12 3	38	13 9	36	14 15	35	15 21	33	16 27	31	17 34	66
68	45	9 43	44	10 48	42	11 53	40	12 57	39	14 2	37	15 7	35	16 13	33	17 18	68
70	47	9 35	45	10 39	44	11 43	42	12 47	41	13 51	39	14 55	38	15 59	36	17 3	70

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T. 12)

Declinação do mesmo nome que a latitude

Latitude	17°		18°		19°		20°		21°		22°		23°		24°		Latitude
	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	
°	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	°
0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	0
1	5 47	3 25	5 48	3 14	5 48	3 4	5 49	2 55	5 50	2 47	5 50	2 40	5 51	2 34	5 51	2 28	1
2	34	6 51	35	6 29	37	6 9	38	5 51	39	5 35	40	5 21	41	5 7	42	4 55	2
3	21	10 19	23	9 45	25	9 15	27	8 48	29	8 24	30	8 2	32	7 42	33	7 24	3
4	7	13 48	10	13 3	13	12 22	16	11 46	18	11 13	20	10 44	22	10 17	24	9 53	4
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6	40	20 57	45	19 46	4 49	18 44	4 53	17 48	4 56	16 57	0	16 12	3	15 31	5	14 53	6
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11	22	40 44	33	38 46	43	35 53	3 51	33 55	3 58	32 10	5	30 37	11	29 14	16	27 59	11
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14	21	55 50	40	51 32	2 54	48 0	7	45 1	18	42 28	28	40 14	36	38 15	44	36 30	14
15	1 55	62 17	2 18	56 53	2 36	52 39	2 50	49 11	3 3	46 14	3 14	43 42	3 23	41 29	3 32	39 31	15
16	21	70 31	1 52	63 7	14	57 51	32	53 42	2 47	50 17	2 59	47 22	10	44 52	20	42 40	16
17	0 0	90 0	19	71 7	1 50	63 54	11	58 45	29	54 40	43	51 18	2 56	48 26	7	45 57	17
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19	50	63 54	1 17	71 39	0 0	90 0	16	72 9	1 45	65 18	6	60 21	23	56 26	37	53 10	19
20	2 11	58 45	1 47	64 37	1 16	72 9	0 0	90 0	1 14	72 38	1 43	65 55	2 4	61 5	2 21	57 14	20
21	29	54 40	2 9	59 34	45	65 18	1 14	72 38	0 0	90 0	13	73 4	1 41	66 21	2	61 47	21
22	43	51 18	26	55 35	2 6	60 21	43	65 55	1 13	73 4	0 0	90 0	11	73 29	1 39	67 5	22
23	56	48 26	40	52 16	23	56 26	2 4	61 5	41	66 31	1 11	73 29	0 0	90 0	10	73 53	23
24	3 7	45 57	53	49 27	37	53 10	21	57 14	2 2	61 47	39	67 5	1 10	73 53	0 0	90 0	24
25	3 16	43 46	3 3	46 59	2 50	50 23	2 35	54 1	2 18	57 59	2 0	62 25	1 38	67 36	1 9	74 16	25
26	25	41 50	13	44 49	3 0	47 58	47	51 17	32	54 50	16	58 43	58	63 2	30	68 5	26
27	33	40 5	22	42 54	10	45 49	3 0	48 53	44	52 8	30	55 36	2 14	59 23	56	63 37	27
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29	46	37 5	36	39 36	26	42 11	16	44 52	3 5	47 40	53	50 36	40	53 42	26	57 2	29
30	3 52	35 47	3 43	38 10	3 34	40 38	3 24	43 10	3 13	45 47	3 2	48 31	2 51	51 24	2 38	54 26	30
31	58	34 35	49	36 52	40	39 12	31	41 37	21	44 6	11	46 40	3 0	49 21	49	52 10	31
32	4 3	33 29	55	35 40	46	37 54	38	40 12	28	42 33	19	44 59	9	47 30	58	50 9	32
33	8	32 28	4 0	34 34	52	36 43	44	38 54	35	41 9	26	43 27	17	45 50	3 7	48 18	33
34	12	31 31	5	33 33	57	35 36	49	37 42	41	39 51	33	42 4	24	44 20	15	46 39	34
35	4 16	30 39	4 9	32 36	4 2	34 35	3 55	36 36	3 47	38 40	3 39	40 47	3 31	42 56	3 22	45 11	35
36	20	29 50	14	31 43	7	33 38	4 0	35 35	52	37 34	45	39 36	37	41 40	29	43 46	36
37	24	29 4	18	30 54	11	32 45	4	34 38	58	36 33	50	38 30	43	40 29	35	42 31	37
38	28	28 21	22	30 8	15	31 56	9	33 45	4 2	35 36	55	37 29	48	39 24	41	41 20	38
39	31	27 41	25	29 25	19	31 9	13	32 55	7	34 43	4 0	36 32	54	38 23	47	40 16	39
40	4 35	27 3	4 29	28 44	4 23	30 26	4 17	32 9	4 11	33 53	4 5	35 39	3 58	37 26	3 52	39 15	40
41	38	26 28	32	28 6	27	29 45	21	31 25	15	33 7	9	34 49	4 3	36 33	57	38 18	41
42	41	25 55	35	27 30	30	29 7	25	30 44	19	32 23	13	34 3	7	35 44	4 1	37 25	42
43	43	25 23	38	26 57	33	28 31	28	30 6	23	31 42	17	33 19	12	34 57	6	36 36	43
44	46	24 53	41	26 25	36	27 57	31	29 30	26	31 3	21	32 38	16	34 14	10	35 49	44
45	4 49	24 25	4 44	25 55	4 39	27 25	4 35	28 56	4 30	30 27	4 25	31 59	4 20	33 33	4 14	35 6	45
46	51	23 59	47	25 26	42	26 55	38	28 23	33	29 53	28	31 23	23	32 54	18	34 25	46
47	54	23 34	49	25 0	45	26 26	41	27 53	36	29 20	31	30 49	27	32 18	22	33 47	47
48	56	23 10	52	24 34	48	25 59	43	27 24	39	28 50	35	30 16	30	31 43	25	33 12	48
49	58	22 48	54	24 10	50	25 33	46	26 57	42	28 21	38	29 46	33	31 11	29	32 35	49
50	5 1	22 26	4 57	23 47	4 53	25 9	4 49	26 31	4 45	27 54	4 41	29 17	4 37	30 40	4 32	32 4	50
52	5	21 47	5 1	23 5	58	24 24	54	25 43	50	27 3	46	28 23	43	29 44	39	31 7	52
54	9	21 11	5	22 27	5 2	23 44	59	25 1	55	26 18	52	27 35	48	28 53	45	30 10	54
56	12	20 39	9	21 53	6	23 7	5 3	24 22	5 0	25 37	57	26 52	53	28 7	50	29 22	56
58	16	20 10	13	21 22	10	22 35	7	23 47	4	25 0	5 2	26 13	58	27 26	55	28 39	58
60	5 19	19 44	5 17	20 54	5 14	22 5	5 11	23 16	5 9	24 27	5 6	25 38	5 3	26 49	5 0	28 0	60
62	23	19 18	20	20 26	18	21 35	15	22 44	13	23 53	10	25 3	8	26 12	5	27 22	62
64	26	18 59	24	20 7	21	21 14	19	22 22	17	23 30	15	24 38	12	25 46	10	26 54	64
66	29	18 40	27	19 46	25	20 53	23	21 59	21	23 6	19	24 13	16	25 19	14	26 26	66
68	32	18 23	30	19 28	28	20 33	26	21 39	24	22 44	22	23 50	20	24 55	19	26 1	68
70	34	18 8	33	19 12	31	20 16	30	21 21	28	22 25	26	23 30	24	24 34	23	25 39	70

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Angulo horario de um Astro e Altura, no instante favoravel, para a determinação da Hora

T. 12)

Latitude	Declinação do mesmo nome que a latitude																				Latitude
	26°		28°		30°		32°		34°		36°		38°		40°			
	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.	Æ.	A.		
o	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′	h m	o ′		o
0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0	6 0	0 0		0
1	5 52	2 17	5 52	2 8	5 53	2 0	5 54	1 53	5 54	1 47	5 54	1 42	5 55	1 37	5 55	1 33		1
2	44	4 34	45	4 16	46	4 0	47	3 47	48	3 35	49	3 24	50	3 15	50	3 7		2
3	35	6 51	37	6 24	39	6 0	41	5 40	42	5 22	43	5 6	45	4 53	46	4 40		3
4	27	9 9	30	8 33	32	8 1	34	7 34	36	7 10	38	6 49	39	6 31	41	6 14		4
5	5 19	11 28	5 22	10 42	5 25	10 2	5 28	9 28	5 30	8 58	5 32	8 32	5 34	8 8	5 36	7 48		5
6	10	13 48	14	12 52	18	12 4	21	11 23	24	10 46	27	10 16	29	9 47	31	9 22		6
7	2	16 8	7	15 3	11	14 6	15	13 18	18	12 35	21	11 58	24	11 25	26	10 56		7
8	4 53	18 31	4 59	17 15	4	16 10	8	15 14	12	14 25	15	13 42	19	13 4	21	12 30		8
9	44	20 54	51	19 28	4 56	18 14	1	17 10	6	16 15	10	15 26	13	14 43	16	14 5		9
10	4 35	23 20	4 43	21 42	4 49	20 19	4 54	19 8	4 59	18 5	5 4	17 11	5 8	16 23	5 11	15 40		10
11	26	25 48	34	23 59	41	22 26	48	21 6	53	19 57	4 58	18 57	2	18 3	6	17 16		11
12	17	28 19	26	26 17	34	24 34	40	23 6	47	21 50	52	20 43	4 57	19 44	1	18 52		12
13	7	30 52	17	28 38	26	26 44	33	25 7	40	23 43	46	22 30	51	21 26	4 56	20 29		13
14	3 57	33 30	8	31 1	18	28 56	26	27 10	33	25 38	40	24 18	46	23 8	51	22 7		14
15	3 47	36 11	3 59	33 27	4 9	31 10	4 18	29 14	4 26	27 34	4 33	26 8	4 40	24 52	4 46	23 45		15
16	36	38 58	49	35 57	1	33 27	11	31 21	19	29 32	27	27 58	34	26 36	40	25 24		16
17	25	41 50	40	38 31	3 52	35 47	3	33 29	12	31 31	20	29 50	28	28 21	35	27 3		17
18	13	44 49	29	41 10	43	38 10	3 55	35 40	5	33 33	14	31 43	22	30 8	29	28 44		18
19	0	47 58	19	43 54	34	40 38	46	37 54	3 57	35 36	7	33 38	15	31 56	23	30 26		19
20	2 47	51 17	3 7	46 46	3 24	43 10	3 38	40 12	3 49	37 42	4 0	35 35	4 9	33 45	4 17	32 9		20
21	32	54 50	2 55	49 46	13	45 47	28	42 33	41	39 51	3 52	37 34	2	35 36	11	33 53		21
22	16	58 43	42	52 56	2	48 31	19	44 59	33	42 4	45	39 36	3 55	37 29	5	35 39		22
23	1 58	63 2	28	56 20	2 51	51 24	9	47 30	24	44 20	37	41 40	48	39 24	3 58	37 26		23
24	36	68 6	13	60 2	38	54 26	2 58	50 8	15	46 40	29	43 47	41	41 21	52	39 15		24
25	1 8	74 36	1 55	64 11	2 25	57 42	2 47	52 54	3 5	49 6	3 20	45 58	3 33	43 21	3 45	41 6		25
26	0 0	90 0	34	69 2	9	61 15	35	55 49	2 55	51 37	11	48 14	25	45 24	38	43 0		26
27	1 7	74 56	6	75 15	1 52	65 14	21	58 57	44	54 17	2	50 34	17	47 31	30	44 56		27
28	34	69 2	0 0	90 0	32	69 52	7	62 22	32	57 6	2 52	53 0	8	49 41	23	46 55		28
29	53	64 43	1 6	75 33	5	75 50	1 50	66 11	19	60 7	41	55 34	2 59	51 57	15	48 57		29
30	2 09	61 15	1 32	69 52	0 0	90 0	1 30	70 39	2 5	63 24	2 30	58 17	2 49	54 18	3 6	51 4		30
31	23	58 20	51	65 43	1 4	76 7	4	76 23	1 48	67 5	17	61 11	39	56 47	2 57	53 15		31
32	35	55 49	2 7	62 22	30	70 39	0 0	90 0	28	71 23	3	64 22	28	59 24	47	55 32		32
33	45	53 36	20	59 32	49	66 38	1 3	76 39	3	76 54	1 47	67 55	15	62 12	37	57 55		33
34	55	51 37	32	57 6	2 5	63 24	28	71 23	0 0	90 0	27	72 3	1	65 16	26	60 27		34
35	3 3	49 51	2 42	54 56	2 18	60 40	1 47	67 30	1 2	77 8	1 2	77 22	1 45	68 42	2 14	63 10		35
36	11	48 14	52	53 0	30	58 17	2 3	64 22	27	72 3	0 0	90 0	26	72 42	0	66 8		36
37	19	46 45	3 0	51 16	40	56 11	16	61 42	46	68 18	1 2	77 36	1	77 49	1 44	69 26		37
38	25	45 24	8	49 41	49	54 18	28	59 24	2 1	65 16	26	72 42	0 0	90 0	26	73 18		38
39	32	44 09	16	48 15	58	52 37	38	57 24	14	62 42	45	69 4	1 1	78 2	1	78 15		39
40	3 38	43 0	3 23	46 55	3 6	51 4	2 47	55 32	2 26	60 27	2 0	66 8	1 26	73 18	0 0	90 0		40
41	43	41 56	29	45 42	14	49 39	56	53 53	36	58 28	13	63 38	44	69 47	1 1	78 28		41
42	49	40 56	35	44 33	20	48 21	3 4	52 22	46	56 41	25	61 27	59	66 56	25	73 52		42
43	54	40 0	41	43 30	27	47 9	12	50 59	55	55 5	35	59 32	2 12	64 31	43	70 29		43
44	59	39 8	46	42 31	33	46 2	19	49 43	3 4	53 37	45	57 48	24	62 25	59	67 43		44
45	4 3	38 19	3 52	41 36	3 39	45 0	3 25	48 32	3 10	52 16	2 54	56 14	2 34	60 32	2 12	65 22		45
46	8	37 33	56	40 45	44	44 2	32	47 27	17	51 1	3 2	54 48	44	58 51	23	63 20		46
47	12	36 50	4 1	39 56	50	43 8	37	46 26	24	49 52	9	53 29	53	57 20	34	61 31		47
48	16	36 9	6	39 11	55	42 17	43	45 29	30	48 48	17	52 16	3 1	55 56	44	59 53		48
49	20	35 31	10	38 28	4 0	41 29	48	44 36	36	47 49	23	51 9	9	54 40	53	58 24		49
50	4 23	34 54	4 14	37 48	4 4	40 45	3 54	43 46	3 42	46 53	3 30	50 7	3 16	53 29	3 1	57 3		50
52	30	33 48	22	36 34	13	39 23	4 3	42 16	53	45 12	42	48 14	30	51 23	16	54 40		52
54	37	32 49	29	35 28	21	38 10	12	40 55	4 3	43 43	53	46 36	42	49 33	30	52 37		54
56	43	31 55	36	34 30	28	37 6	20	39 44	12	42 25	4 3	45 9	53	47 57	42	50 50		56
58	49	31 8	42	33 37	35	36 8	28	38 40	20	41 15	12	43 53	4 3	46 33	54	49 17		58
60	4 55	30 25	4 48	32 50	4 42	35 16	4 35	37 44	4 28	40 13	4 21	42 45	4 13	45 19	4 4	47 55		60
62	5 0	29 46	54	32 7	48	34 30	42	36 53	36	39 18	29	41 44	22	44 13	14	46 43		62
64	5	29 11	5 0	31 30	55	33 48	49	36 8	43	38 28	37	40 51	30	43 14	23	45 40		64
66	10	28 41	5	30 55	5 0	33 11	55	35 27	50	37 45	45	40 3	39	42 22	32	44 43		66
68	15	28 13	10	30 26	6	32 38	5 2	34 51	57	37 6	52	39 20	46	41 36	41	43 53		68
70	19	27 48	15	29 59	11	32 9	7	34 20	5 3	36 31	59	38 43	54	40 56	49	43 10		70

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Variação do Angulo no Polo para um minuto de mudança em Latitude

Latitude e Angulo horario

Angulo horario menor que 6 h.: Astro a E +, Astro a W —
Angulo horario maior que 6 h.: Astro a E —, Astro a W +

T. 13)

Latitude	0 horas			1 hora						2 horas						3 h.
	30m	40m	50m	0m	10m	20m	30m	40m	50m	0m	10m	20m	30m	40m	50m	0m
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.27	.20	.16	.13	.11	.10	.08	.07	.07	.06	.05	.05	.04	.04	.04	.03
4	.53	.40	.32	.26	.22	.19	.17	.15	.13	.12	.11	.10	.09	.08	.08	.07
6	.80	.60	.47	.39	.33	.29	.25	.23	.20	.18	.16	.15	.14	.13	.11	.10
8	1.07	.80	.63	.52	.45	.39	.34	.30	.27	.24	.22	.20	.18	.17	.15	.14
10	1.34	1.00	.80	.66	.56	.48	.43	.38	.34	.31	.28	.25	.23	.21	.19	.18
12	1.61	1.21	.96	.79	.67	.58	.51	.46	.41	.37	.33	.30	.28	.25	.23	.21
14	1.89	1.41	1.12	.93	.79	.69	.60	.53	.48	.43	.39	.36	.32	.30	.27	.25
16	2.18	1.63	1.29	1.07	.91	.79	.69	.61	.55	.50	.45	.41	.37	.34	.31	.28
18	2.47	1.84	1.46	1.21	1.03	.89	.78	.70	.62	.56	.51	.46	.42	.39	.35	.32
20	2.76	2.06	1.64	1.36	1.15	1.00	.88	.78	.70	.63	.57	.52	.47	.43	.40	.36
22	3.07	2.29	1.82	1.51	1.28	1.11	.97	.87	.78	.70	.63	.58	.53	.48	.44	.40
24	3.38	2.52	2.01	1.66	1.41	1.22	1.07	.95	.86	.77	.70	.64	.58	.53	.48	.45
26	3.70	2.77	2.20	1.82	1.55	1.34	1.18	1.05	.94	.84	.77	.70	.64	.58	.53	.49
28	4.04	3.02	2.40	1.98	1.69	1.46	1.28	1.14	1.02	.92	.83	.76	.69	.63	.58	.53
30	4.39	3.27	2.60	2.15	1.83	1.59	1.39	1.24	1.11	1.00	.91	.82	.75	.69	.63	.58
32	4.75	3.54	2.82	2.33	1.98	1.72	1.51	1.34	1.20	1.08	.98	.89	.81	.74	.68	.62
34	5.12	3.83	3.04	2.52	2.14	1.85	1.63	1.45	1.30	1.17	1.06	.96	.88	.80	.74	.67
36	5.52	4.12	3.27	2.71	2.30	2.00	1.75	1.56	1.40	1.26	1.14	1.04	.95	.87	.79	.72
38	5.93	4.43	3.52	2.92	2.48	2.15	1.89	1.68	1.50	1.35	1.23	1.12	1.02	.93	.85	.78
40	6.37	4.76	3.78	3.13	2.66	2.31	2.03	1.80	1.61	1.45	1.32	1.20	1.09	1.00	.91	.84
42	6.84	5.11	4.06	3.36	2.85	2.47	2.17	1.93	1.73	1.56	1.42	1.29	1.17	1.07	.98	.90
44	7.34	5.48	4.36	3.60	3.06	2.65	2.33	2.07	1.85	1.67	1.52	1.38	1.26	1.15	1.05	.96
46	7.87	5.87	4.67	3.86	3.28	2.85	2.50	2.22	1.99	1.79	1.63	1.48	1.35	1.23	1.13	1.03
48	8.44	6.30	5.01	4.14	3.52	3.05	2.68	2.38	2.14	1.92	1.74	1.59	1.45	1.32	1.21	1.11
50	9.05	6.76	5.37	4.45	3.78	3.27	2.88	2.56	2.29	2.06	1.87	1.70	1.56	1.42	1.30	1.19
52	9.72	7.26	5.77	4.78	4.06	3.52	3.09	2.74	2.46	2.22	2.01	1.83	1.67	1.53	1.40	1.28
54		7.81	6.21	5.14	4.37	3.78	3.32	2.95	2.64	2.38	2.16	1.97	1.79	1.64	1.50	1.37
56		8.41	6.69	5.53	4.70	4.07	3.58	3.18	2.85	2.57	2.33	2.12	1.93	1.77	1.62	1.48
58		9.08	7.22	5.97	5.07	4.40	3.86	3.43	3.07	2.77	2.51	2.29	2.09	1.91	1.75	1.60
60		9.82	7.81	6.46	5.49	4.76	4.17	3.71	3.33	3.00	2.72	2.47	2.26	2.06	1.89	1.73
62			8.48	7.02	5.96	5.17	4.54	4.03	3.61	3.26	2.95	2.69	2.45	2.24	2.05	1.88
64			9.25	7.65	6.50	5.63	4.95	4.40	3.94	3.55	3.22	2.93	2.67	2.44	2.24	2.05
66				8.38	7.12	6.17	5.42	4.82	4.31	3.89	3.53	3.21	2.93	2.68	2.45	2.25
68				9.24	7.85	6.80	5.98	5.31	4.75	4.29	3.88	3.53	3.23	2.95	2.70	2.47

Latitude	30m	20m	10m	0m	50m	40m	30m	20m	10m	0m	50m	40m	30m	20m	10m	0m
	11 horas				10 horas						9 horas					

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Variação do Angulo no Polo para um Minuto de mudança em Latitude

Latitude e Angulo horario

Angulo horario menor que 6 h.: Astro a E +, Astro a W —.
Angulo horario maior que 6 h.: Astro a E —, Astro a W +.

T. 13)

Latitude	2 h.	3 horas					4 horas			5 horas		6 h.
	50m	0m	12m	24m	36m	48m	0m	20m	40m	0m	30m	0m
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	0
2	.04	.03	.03	.03	.03	.02	.02	.02	.01	.01	.01	0
4	.08	.07	.06	.06	.05	.05	.04	.03	.02	.02	.01	0
6	.11	.10	.09	.09	.08	.07	.06	.05	.04	.03	.02	0
8	.15	.14	.13	.11	.10	.09	.08	.07	.05	.04	.02	0
10	.19	.18	.16	.14	.13	.11	.10	.08	.07	.05	.02	0
12	.23	.21	.19	.17	.15	.14	.12	.10	.08	.06	.03	0
14	.27	.25	.22	.20	.18	.16	.14	.12	.09	.07	.03	0
16	.31	.28	.26	.23	.21	.19	.17	.13	.10	.08	.04	0
18	.35	.32	.29	.26	.24	.21	.19	.15	.12	.09	.04	0
20	.40	.36	.33	.29	.26	.24	.21	.17	.13	.10	.05	0
22	.44	.40	.36	.33	.29	.26	.23	.19	.15	.11	.06	0
24	.48	.45	.40	.36	.32	.29	.26	.21	.16	.12	.06	0
26	.53	.49	.44	.40	.35	.32	.28	.23	.18	.13	.07	0
28	.58	.53	.48	.43	.39	.35	.31	.25	.19	.14	.07	0
30	.63	.58	.52	.47	.42	.37	.33	.27	.21	.15	.08	0
32	.68	.62	.56	.51	.45	.41	.36	.29	.23	.17	.08	0
34	.74	.67	.61	.55	.49	.44	.39	.31	.25	.18	.09	0
36	.79	.72	.65	.59	.53	.47	.42	.34	.27	.19	.10	0
38	.85	.78	.70	.63	.57	.51	.45	.36	.29	.21	.10	0
40	.91	.84	.76	.68	.61	.54	.48	.39	.31	.22	.11	0
42	.98	.90	.81	.73	.65	.58	.52	.42	.33	.24	.12	0
44	1.05	.96	.87	.78	.70	.63	.56	.45	.35	.26	.13	0
46	1.13	1.03	.93	.84	.75	.67	.60	.48	.38	.28	.14	0
48	1.21	1.11	1.00	.90	.81	.72	.64	.52	.41	.30	.15	0
50	1.30	1.19	1.07	.97	.87	.77	.69	.56	.44	.32	.16	0
52	1.40	1.28	1.15	1.04	.93	.83	.74	.60	.47	.34	.17	0
54	1.50	1.37	1.24	1.12	1.00	.89	.79	.64	.50	.37	.18	0
56	1.62	1.48	1.33	1.20	1.08	.96	.86	.69	.54	.40	.19	0
58	1.75	1.60	1.44	1.30	1.16	1.04	.92	.75	.58	.43	.21	0
60	1.89	1.73	1.56	1.40	1.26	1.12	1.00	.81	.63	.46	.23	0
62	2.05	1.88	1.69	1.52	1.37	1.22	1.09	.87	.68	.50	.25	0
64	2.24	2.05	1.85	1.66	1.49	1.33	1.18	.95	.75	.55	.27	0
66	2.45	2.25	2.02	1.82	1.63	1.46	1.30	1.05	.82	.60	.30	0
68	2.70	2.47	2.23	2.01	1.80	1.61	1.43	1.15	.90	.66	.33	0
Latitude	10m	0m	48m	36m	24m	12m	0m	40m	20m	0m	30m	0m
	9 horas		8 horas					7 horas			6 horas	

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Variação do Angulo no Polo para um Minuto de mudança em Latitude

Declinação e Angulo horario

Lat. e Decl. do mesmo nome: Astro a E —, Astro a W +.
Lat. e Decl. de nome contrario: Astro a E +, Astro a W —.

T. 13-a)

Declinação	0 horas			1 hora						2 horas						3 h.
	30m	40m	50m	0m	10m	20m	30m	40m	50m	0m	10m	20m	30m	40m	50m	0m
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.27	.20	.16	.13	.12	.10	.09	.08	.08	.07	.06	.06	.06	.05	.05	.05
4	.54	.40	.32	.27	.23	.20	.18	.17	.15	.14	.13	.12	.11	.11	.10	.10
6	.81	.61	.49	.41	.35	.31	.27	.25	.23	.21	.20	.18	.17	.16	.16	.15
8	1.08	.81	.65	.54	.47	.41	.37	.33	.30	.28	.26	.25	.23	.22	.21	.20
10	1.35	1.02	.81	.68	.59	.52	.46	.42	.38	.35	.33	.31	.29	.27	.26	.25
12	1.63	1.22	.98	.82	.71	.62	.56	.50	.46	.43	.40	.37	.35	.33	.32	.30
14	1.91	1.44	1.15	.96	.83	.73	.65	.59	.54	.50	.46	.43	.41	.39	.37	.35
16	2.20	1.65	1.32	1.11	.95	.84	.75	.68	.62	.57	.53	.50	.47	.45	.43	.41
18	2.49	1.87	1.50	1.26	1.08	.95	.85	.77	.70	.65	.60	.57	.53	.51	.48	.46
20	2.79	2.10	1.68	1.41	1.21	1.06	.95	.86	.79	.73	.68	.63	.60	.57	.54	.51
22	3.10	2.33	1.87	1.56	1.34	1.18	1.06	.96	.87	.81	.75	.70	.66	.63	.60	.57
24	3.41	2.56	2.06	1.72	1.48	1.30	1.16	1.05	.96	.89	.83	.78	.73	.69	.66	.63
26	3.74	2.81	2.25	1.88	1.62	1.43	1.27	1.15	1.06	.98	.91	.85	.80	.76	.72	.69
28	4.07	3.06	2.46	2.05	1.77	1.55	1.39	1.26	1.15	1.06	.99	.93	.87	.83	.79	.75
30	4.42	3.32	2.67	2.23	1.92	1.69	1.51	1.37	1.25	1.15	1.07	1.01	.95	.90	.86	.82
32	4.79	3.60	2.89	2.41	2.08	1.83	1.63	1.48	1.35	1.25	1.16	1.09	1.03	.97	.93	.89
34	5.17	3.88	3.12	2.61	2.24	1.97	1.76	1.60	1.46	1.35	1.25	1.18	1.11	1.05	1.00	.96
36	5.57	4.18	3.36	2.81	2.42	2.12	1.90	1.72	1.57	1.45	1.35	1.27	1.19	1.13	1.08	1.03
38	5.99	4.50	3.61	3.02	2.60	2.28	2.04	1.85	1.69	1.56	1.45	1.36	1.28	1.22	1.16	1.11
40	6.43	4.83	3.88	3.24	2.79	2.45	2.19	1.99	1.82	1.68	1.56	1.46	1.38	1.31	1.24	1.19
42	6.90	5.19	4.16	3.48	2.99	2.63	2.35	2.13	1.95	1.80	1.68	1.57	1.48	1.40	1.33	1.28
44	7.40	5.56	4.46	3.73	3.21	2.82	2.52	2.20	2.09	1.93	1.80	1.68	1.59	1.50	1.43	1.37
46	7.93	5.96	4.78	4.00	3.44	3.03	2.71	2.45	2.24	2.07	1.93	1.81	1.70	1.61	1.53	1.47
48	8.51	6.40	5.13	4.29	3.69	3.25	2.90	2.63	2.41	2.22	2.07	1.94	1.82	1.73	1.64	1.57
50	9.13	6.86	5.51	4.60	3.96	3.48	3.12	2.82	2.58	2.38	2.22	2.08	1.96	1.85	1.76	1.68
52	9.81	7.37	5.91	4.95	4.26	3.74	3.35	3.03	2.77	2.56	2.38	2.23	2.10	1.99	1.90	1.81
54		7.93	6.36	5.32	4.58	4.02	3.60	3.26	2.98	2.75	2.56	2.40	2.26	2.14	2.04	1.95
56		8.54	6.85	5.73	4.93	4.34	3.87	3.51	3.21	2.97	2.76	2.58	2.46	2.31	2.20	2.10
58		9.22	7.39	6.18	5.32	4.68	4.18	3.79	3.47	3.20	2.98	2.79	2.63	2.49	2.37	2.27
60		9.97	8.00	6.69	5.76	5.06	4.52	4.10	3.75	3.46	3.22	3.02	2.85	2.69	2.56	2.45
62			8.69	7.27	6.25	5.50	4.91	4.45	4.07	3.76	3.50	3.28	3.09	2.93	2.78	2.66
64			9.47	7.92	6.82	5.90	5.36	4.85	4.44	4.10	3.82	3.57	3.37	3.19	3.03	2.90
66				8.68	7.47	6.57	5.87	5.31	4.86	4.49	4.18	3.92	3.69	3.49	3.32	3.18
68				9.56	8.23	7.24	6.47	5.86	5.36	4.95	4.61	4.32	4.07	3.85	3.66	3.50

Declinação	30m	20m	10m	0m	50m	40m	30m	20m	10m	0m	50m	40m	30m	20m	10m	0m
	11 horas				10 horas						9 horas					

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Variação do Angulo no Polo para um minuto de mudança em Latitude

Declinação e Angulo horario

Lat. e Decl. do mesmo nome: Astro a E —, Astro a W +
Lat. e Decl. de nome contrario: Astro a E +, Astro a W —

T. 13-a)

Declinação	2 h.	3 horas					4 horas			5 horas		6 h.
	50ᵐ	0ᵐ	12ᵐ	24ᵐ	36ᵐ	48ᵐ	0ᵐ	20ᵐ	40ᵐ	0ᵐ	30ᵐ	0ᵐ
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.05	.05	.05	.04	.04	.04	.04	.04	.04	.04	.04	.03
4	.10	.10	.09	.09	.09	.08	.08	.08	.07	.07	.07	.07
6	.16	.15	.14	.14	.13	.13	.12	.12	.11	.11	.11	.11
8	.21	.20	.19	.18	.17	.17	.16	.16	.15	.15	.14	.14
10	.26	.25	.24	.23	.22	.21	.20	.19	.19	.18	.18	.18
12	.32	.30	.29	.27	.26	.25	.25	.23	.23	.22	.21	.21
14	.37	.35	.34	.32	.31	.30	.29	.27	.27	.26	.25	.25
16	.43	.41	.39	.37	.35	.34	.33	.32	.31	.30	.29	.29
18	.48	.46	.44	.42	.40	.39	.38	.36	.35	.34	.33	.32
20	.54	.51	.49	.47	.45	.43	.42	.40	.39	.38	.37	.36
22	.60	.57	.54	.52	.50	.48	.47	.45	.43	.42	.41	.40
24	.66	.63	.60	.57	.55	.53	.51	.49	.47	.46	.45	.45
26	.72	.69	.66	.63	.60	.58	.56	.54	.52	.50	.49	.49
28	.79	.75	.72	.68	.66	.63	.61	.59	.57	.55	.54	.53
30	.86	.82	.78	.74	.71	.69	.67	.64	.62	.60	.58	.58
32	.93	.89	.84	.80	.77	.75	.72	.69	.67	.65	.63	.62
34	1.00	.96	.91	.87	.83	.80	.78	.75	.72	.70	.68	.67
36	1.08	1.03	.98	.93	.90	.87	.84	.80	.77	.75	.73	.73
38	1.16	1.11	1.05	1.00	.97	.93	.90	.86	.83	.81	.79	.78
40	1.24	1.19	1.13	1.08	1.04	1.00	.97	.93	.89	.87	.85	.84
42	1.33	1.28	1.21	1.16	1.11	1.07	1.04	.99	.96	.93	.91	.90
44	1.43	1.37	1.30	1.24	1.19	1.15	1.11	1.07	1.03	1.00	.97	.97
46	1.53	1.47	1.39	1.33	1.28	1.23	1.20	1.14	1.10	1.07	1.05	1.04
48	1.64	1.57	1.49	1.43	1.37	1.32	1.28	1.22	1.18	1.15	1.12	1.11
50	1.76	1.68	1.60	1.53	1.47	1.42	1.38	1.31	1.27	1.23	1.20	1.19
52	1.90	1.81	1.72	1.65	1.58	1.53	1.48	1.41	1.36	1.33	1.29	1.28
54	2.04	1.95	1.85	1.77	1.70	1.64	1.59	1.52	1.46	1.42	1.39	1.38
56	2.20	2.10	2.00	1.91	1.83	1.77	1.71	1.64	1.58	1.54	1.50	1.48
58	2.37	2.27	2.15	2.06	1.98	1.91	1.85	1.77	1.71	1.66	1.62	1.60
60	2.56	2.45	2.33	2.23	2.14	2.06	2.00	1.91	1.84	1.79	1.75	1.73
62	2.78	2.66	2.53	2.42	2.32	2.24	2.17	2.08	2.00	1.95	1.90	1.88
64	3.03	2.90	2.76	2.64	2.53	2.44	2.37	2.26	2.18	2.12	2.07	2.05
66	3.32	3.18	3.02	2.89	2.78	2.68	2.59	2.48	2.39	2.33	2.27	2.25
68	3.66	3.50	33.3	3.18	3.06	2.95	2.86	2.73	2.63	2.56	2.50	2.48
Declinação	10ᵐ	0ᵐ	48ᵐ	36ᵐ	24ᵐ	12ᵐ	0ᵐ	40ᵐ	20ᵐ	0ᵐ	30ᵐ	0ᵐ
	9 horas		8 horas					7 horas			6 horas	

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Azimuths

Se a correcção é + } o Azimuth conta-se do { Astro a E. Polo inferior / Astro a W. Polo superior
Se a correcção é — } o Azimuth conta-se do { Astro a E. Polo superior / Astro a W. Polo inferior

T. 14)

Corr.	Latitude																		
	0°	10°	15°	20°	25°	30°	34°	38°	42°	45°	48°	51°	54°	57°	60°	62°	64°	66°	68°
′	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
0.00	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
0.01	89.4	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.6	89.6	89.6	89.6	89.7	89.7	89.7	89.7	89.7	89.8	89.8
0.02	88.9	88.9	88.9	88.9	89.0	89.0	89.0	89.1	89.1	89.2	89.2	89.3	89.3	89.4	89.4	89.5	89.5	89.5	89.6
0.03	88.3	88.3	88.3	88.4	88.4	88.5	88.6	88.6	88.7	88.8	88.8	88.9	89.0	89.1	89.1	89.2	89.2	89.3	89.4
0.04	87.7	87.7	87.8	87.8	87.9	88.0	88.1	88.2	88.3	88.4	88.5	88.6	88.7	88.8	88.9	88.9	89.0	89.1	89.1
0.05	87.1	87.2	87.2	87.3	87.4	87.5	87.6	87.7	87.9	88.0	88.1	88.2	88.3	88.4	88.6	88.7	88.7	88.8	88.9
0.06	86.6	86.6	86.7	86.8	86.9	87.0	87.2	87.3	87.4	87.6	87.7	87.8	88.0	88.1	88.3	88.4	88.5	88.6	88.7
0.07	86.0	86.1	86.1	86.2	86.4	86.5	86.7	86.8	87.0	87.2	87.3	87.5	87.6	87.8	88.0	88.1	88.2	88.4	88.5
0.08	85.4	85.5	85.6	85.7	85.9	86.0	86.2	86.4	86.6	86.8	86.9	87.1	87.3	87.5	87.7	87.8	88.0	88.1	88.3
0.09	84.8	84.9	85.0	85.2	85.3	85.5	85.7	85.9	86.2	86.4	86.6	86.8	87.0	87.2	87.4	87.6	87.7	87.9	88.1
0.10	84.3	84.4	84.5	84.6	84.8	85.0	85.3	85.5	85.8	86.0	86.2	86.4	86.6	86.9	87.1	87.3	87.5	87.7	87.9
0.12	83.2	83.3	83.4	83.6	83.8	84.1	84.3	84.6	84.9	85.1	85.4	85.7	86.0	86.3	86.6	86.8	87.0	87.2	87.4
0.14	82.0	82.1	82.3	82.5	82.8	83.1	83.4	83.7	84.1	84.3	84.6	84.9	85.3	85.6	86.0	86.3	86.5	86.7	87.0
0.16	80.9	81.0	81.2	81.4	81.7	82.1	82.4	82.8	83.2	83.5	83.9	84.2	84.6	85.0	85.4	85.7	86.0	86.3	86.6
0.18	79.8	80.0	80.1	80.4	80.7	81.1	81.5	81.9	82.4	82.7	83.1	83.5	84.0	84.4	84.9	85.2	85.5	85.8	86.1
0.20	78.7	78.9	79.1	79.4	79.7	80.2	80.6	81.0	81.5	81.9	82.4	82.8	83.3	83.8	84.3	84.6	85.0	85.3	85.7
0.22	77.6	77.8	78.0	78.3	78.7	79.2	79.7	80.2	80.7	81.2	81.6	82.1	82.6	83.2	83.7	84.1	84.5	84.9	85.3
0.24	76.5	76.7	76.9	77.3	77.7	78.3	78.7	79.3	79.9	80.4	80.9	81.4	82.0	82.6	83.2	83.6	84.0	84.4	84.9
0.26	75.4	75.6	75.9	76.3	76.7	77.3	77.8	78.4	79.0	79.5	80.1	80.7	81.3	81.9	82.6	83.0	83.5	84.0	84.4
0.28	74.4	74.6	74.9	75.3	75.8	76.4	76.9	77.6	78.2	78.8	79.4	80.0	80.7	81.3	82.0	82.5	83.0	83.5	84.0
0.30	73.3	73.5	73.8	74.3	74.8	75.4	76.0	76.7	77.4	78.0	78.6	79.3	80.0	80.7	81.5	82.0	82.5	83.0	83.6
0.32	72.3	72.5	72.8	73.3	73.8	74.5	75.1	75.8	76.6	77.2	77.9	78.6	79.3	80.1	80.9	81.5	82.0	82.6	83.2
0.34	71.2	71.5	71.8	72.3	72.9	73.6	74.3	75.0	75.8	76.4	77.2	77.9	78.7	79.5	80.4	80.9	81.5	82.1	82.7
0.36	70.2	70.5	70.8	71.3	71.9	72.7	73.4	74.2	75.0	75.7	76.5	77.2	78.1	78.9	79.8	80.4	81.0	81.7	82.3
0.38	69.2	69.5	69.8	70.3	71.0	71.8	72.5	73.3	74.2	75.0	75.7	76.5	77.4	78.3	79.2	79.9	80.5	81.2	81.9
0.40	68.2	68.5	68.9	69.4	70.1	70.9	71.7	72.5	73.4	74.2	75.0	75.9	76.8	77.7	78.7	79.4	80.1	80.8	81.5
0.42	67.2	67.5	67.9	68.5	69.2	70.0	70.8	71.7	72.7	73.5	74.3	75.2	76.1	77.1	78.1	78.8	79.6	80.3	81.1
0.44	66.3	66.6	67.0	67.5	68.3	69.1	70.0	70.9	71.9	72.7	73.6	74.5	75.5	76.5	77.6	78.3	79.1	79.9	80.6
0.46	65.3	65.6	66.0	66.6	67.4	68.3	69.1	70.1	71.1	72.0	72.9	73.9	74.9	75.9	77.0	77.8	78.6	79.4	80.2
0.48	64.4	64.7	65.1	65.7	66.5	67.4	68.3	69.3	70.4	71.3	72.2	73.2	74.2	75.3	76.5	77.3	78.1	79.0	79.8
0.50	63.4	63.8	64.2	64.8	65.6	66.6	67.5	68.5	69.6	70.5	71.5	72.5	73.6	74.8	76.0	76.8	77.6	78.5	79.4
0.53	62.1	62.4	62.9	63.5	64.3	65.3	66.3	67.3	68.5	69.5	70.5	71.6	72.7	73.9	75.2	76.0	76.9	77.8	78.8
0.56	60.8	61.1	61.6	62.2	63.1	64.1	65.1	66.2	67.4	68.4	69.5	70.6	71.8	73.0	74.4	75.3	76.2	77.2	78.2
0.59	59.5	59.8	60.3	61.0	61.9	62.9	63.9	65.1	66.3	67.4	68.5	69.6	70.9	72.2	73.6	74.5	75.5	76.5	77.5
0.62	58.2	58.6	59.1	59.8	60.7	61.8	62.8	64.0	65.3	66.3	67.5	68.7	70.0	71.3	72.8	73.8	74.8	75.8	76.9
0.65	57.0	57.4	57.9	58.6	59.5	60.6	61.7	62.9	64.2	65.3	66.5	67.8	69.1	70.5	72.0	73.0	74.1	75.2	76.3
0.68	55.8	56.2	56.7	57.4	58.3	59.5	60.6	61.8	63.2	64.3	65.5	66.8	68.2	69.7	71.2	72.3	73.4	74.5	75.7
0.71	54.6	55.0	55.6	56.3	57.2	58.4	59.5	60.8	62.2	63.3	64.6	65.9	67.3	68.9	70.5	71.6	72.7	73.9	75.1
0.74	53.5	53.9	54.4	55.2	56.2	57.3	58.5	59.8	61.2	62.4	63.7	65.0	66.5	68.0	69.7	70.8	72.0	73.2	74.5
0.77	52.4	52.8	53.4	54.1	55.1	56.3	57.4	58.8	60.2	61.4	62.7	64.1	65.6	67.2	68.9	70.1	71.3	72.6	73.9
0.80	51.3	51.8	52.3	53.1	54.1	55.3	56.4	57.8	59.3	60.5	61.8	63.3	64.8	66.5	68.2	69.4	70.7	72.0	73.3
0.84	50.0	50.4	50.9	51.7	52.7	54.0	55.1	56.5	58.0	59.3	60.7	62.1	63.7	65.4	67.2	68.5	69.8	71.1	72.5
0.88	48.7	49.1	49.6	50.4	51.4	52.7	53.9	55.3	56.8	58.1	59.5	61.0	66.7	64.4	66.2	67.6	68.9	70.3	71.8
0.92	47.4	47.8	48.4	49.2	50.2	51.5	52.7	54.1	55.6	57.0	58.4	59.9	61.6	63.4	65.3	66.6	68.0	69.5	71.0
0.96	46.2	46.6	47.2	48.0	49.0	50.3	51.5	52.9	54.5	55.8	57.3	58.9	60.6	62.4	64.4	65.7	67.2	68.7	70.2
1.00	45.0	45.4	46.0	46.8	47.8	49.1	50.3	51.8	53.4	54.7	56.2	57.8	59.6	61.4	63.4	64.9	66.4	67.9	69.5
1.05	43.6	44.0	44.6	45.4	46.4	47.8	49.0	50.4	52.0	53.4	54.9	56.5	58.3	60.2	62.3	63.8	65.3	66.9	68.5

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Azimuths

		Astro a E.	Astro a W.
Se a correcção é +	o Azimuth conta-se do	Polo inferior	Polo superior
Se a correcção é —		Polo superior	Polo inferior

T. 14)

Corr.	Latitude																		
	0°	10°	15°	20°	25°	30°	34°	38°	42°	45°	48°	51°	54°	57°	60°	62°	64°	66°	68°
′	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
1.05	43.6	44.0	44.6	45.4	46.4	47.8	49.0	50.4	52.0	53.4	54.9	56.5	58.3	60.2	62.3	63.8	65.3	66.9	68.5
1.10	42.3	42.7	43.3	44.1	45.1	46.5	47.6	49.1	50.7	52.2	53.6	55.3	57.1	59.1	61.2	62.7	64.3	65.9	67.6
1.15	41.0	41.4	42.0	42.8	43.8	45.2	46.4	47.8	49.5	50.9	52.4	54.1	55.9	57.9	60.0	61.6	63.3	64.9	66.7
1.20	39.8	40.2	40.8	41.6	42.6	43.9	45.2	46.6	48.3	49.7	51.2	52.9	54.8	56.8	59.0	60.6	62.3	64.0	65.8
1.25	38.7	39.1	39.6	40.4	41.4	42.7	44.0	45.4	47.1	48.5	50.1	51.8	53.7	55.8	58.0	59.6	61.3	63.1	64.9
1.30	37.6	38.0	38.5	39.3	40.3	41.6	42.9	44.3	46.0	47.4	49.0	50.7	52.6	54.7	57.0	58.6	60.3	62.1	64.0
1.35	36.5	37.0	37.5	38.1	39.3	40.4	41.8	43.2	44.9	46.3	47.9	49.6	51.6	53.7	56.0	57.6	59.4	61.2	63.2
1.40	35.5	36.0	36.5	37.2	38.2	39.5	40.7	42.2	43.9	45.3	46.9	48.6	50.6	52.7	55.0	56.7	58.5	60.3	62.3
1.45	34.6	35.0	35.5	36.2	37.3	38.4	39.8	41.2	42.9	44.3	45.9	47.6	49.6	51.7	54.1	55.8	57.6	59.5	61.5
1.50	33.7	34.1	34.6	35.4	36.3	37.6	38.8	40.2	41.9	43.3	44.9	46.7	48.6	50.8	53.1	54.8	56.7	58.6	60.7
1.60	32.0	32.4	32.9	33.6	34.6	35.8	37.0	38.4	40.1	41.5	43.0	44.8	46.8	48.9	51.3	53.1	55.0	56.9	59.1
1.70	30.5	30.9	31.4	32.1	33.0	34.2	35.4	36.8	38.4	39.8	41.3	43.1	45.0	47.2	49.6	51.4	53.3	55.3	57.5
1.80	29.1	29.4	29.9	30.6	31.5	32.7	33.8	35.2	36.8	38.2	39.7	41.4	43.4	45.6	48.0	49.8	51.7	53.8	56.0
1.90	27.8	28.2	28.6	29.3	30.1	31.3	32.4	33.7	35.3	36.7	38.2	39.9	41.8	44.0	46.5	48.3	50.2	52.3	54.6
2.00	26.6	26.9	27.4	28.0	28.9	30.0	31.1	32.4	33.9	35.3	36.8	38.5	40.4	42.6	45.0	46.8	48.8	50.9	53.2
2.10	25.5	25.8	26.2	26.9	27.7	28.9	29.9	31.2	32.7	34.0	35.4	37.1	39.0	41.2	43.6	45.4	47.4	49.5	51.8
2.20	24.4	24.8	25.2	25.8	26.6	27.7	28.7	30.0	31.5	32.7	34.2	35.8	37.7	39.8	42.3	44.1	46.0	48.2	50.5
2.30	23.5	23.8	24.2	24.8	25.6	26.8	27.7	28.9	30.4	31.6	33.0	34.6	36.5	38.6	41.0	42.8	44.8	46.9	49.3
2.40	22.6	22.9	23.3	23.9	24.7	25.7	26.7	27.9	29.3	30.5	31.9	33.5	35.3	37.4	39.8	41.6	43.5	45.7	48.0
2.60	21.0	21.3	21.7	22.3	23.0	23.9	24.9	26.0	27.4	28.5	29.9	31.4	33.2	35.2	37.6	39.3	41.3	43.4	45.8
2.80	19.7	19.9	20.3	20.8	21.5	22.4	23.3	24.4	25.7	26.8	28.1	29.6	31.3	33.3	35.5	37.3	39.2	41.3	43.6
3.00	18.4	18.7	19.0	19.5	20.2	21.0	21.9	22.9	24.2	25.2	26.5	27.9	29.6	31.5	33.7	35.4	37.2	39.3	41.7
3.25	17.1	17.3	17.7	18.1	18.7	19.6	20.4	21.3	22.5	23.5	24.7	26.1	27.6	29.5	31.6	33.2	35.1	37.1	39.4
3.50	15.9	16.2	16.5	16.9	17.5	18.3	19.0	19.9	21.0	22.0	23.1	24.4	25.9	27.7	29.7	31.3	33.1	35.1	37.3
3.75	14.9	15.2	15.4	15.8	16.4	17.2	17.8	18.7	19.8	20.7	21.7	23.0	24.4	26.1	28.1	29.6	31.3	33.3	35.4
4.00	14.0	14.2	14.5	14.9	15.4	16.1	16.8	17.5	18.6	19.5	20.5	21.7	23.0	24.7	26.6	28.0	29.7	31.6	33.7
4.25	13.2	13.4	13.7	14.1	14.6	15.2	15.8	16.6	17.5	18.4	19.4	20.5	21.8	23.4	25.2	26.6	28.2	30.1	32.1
4.50	12.5	12.7	13.0	13.3	13.8	14.4	15.0	15.8	16.6	17.4	18.4	19.5	20.7	22.2	24.0	25.3	26.9	28.7	30.7
5.00	11.3	11.5	11.7	12.0	12.4	13.0	13.6	14.2	15.1	15.8	16.6	17.6	18.8	20.2	21.8	23.1	24.5	26.2	28.1
6.00	9.5	9.6	9.8	10.1	10.4	10.9	11.4	11.9	12.6	13.3	14.0	14.8	15.8	17.0	18.4	19.5	20.8	22.3	24.0
7.00	8.1	8.3	8.4	8.7	9.0	9.4	9.8	10.3	10.9	11.4	12.1	12.8	13.7	14.7	15.9	16.9	18.1	19.4	20.9
8.00	7.1	7.2	7.4	7.6	7.9	8.2	8.6	9.0	9.5	10.0	10.6	11.2	12.0	12.9	14.0	14.9	15.9	17.1	18.5
9.00	6.3	6.4	6.6	6.7	7.0	7.3	7.6	8.0	8.5	8.9	9.4	10.0	10.7	11.5	12.5	13.3	14.2	15.3	16.5
10.00	5.7	5.8	5.9	6.1	6.3	6.6	6.9	7.2	7.7	8.0	8.5	9.0	9.7	10.4	11.3	12.0	12.9	13.8	14.9
11.00	5.2	5.3	5.4	5.5	5.7	6.0	6.3	6.6	7.0	7.3	7.7	8.2	8.8	9.5	10.3	11.0	11.7	12.6	13.6
12.00	4.8	4.8	4.9	5.1	5.3	5.5	5.7	6.0	6.4	6.7	7.1	7.5	8.1	8.7	9.5	10.1	10.8	11.6	12.5
13.00	4.4	4.5	4.6	4.7	4.9	5.1	5.3	5.6	5.9	6.2	6.6	7.0	7.5	8.0	8.7	9.3	10.0	10.7	11.6
14.00	4.1	4.1	4.2	4.3	4.5	4.7	4.9	5.2	5.5	5.8	6.1	6.5	6.9	7.5	8.1	8.6	9.3	10.0	10.8
15.00	3.8	3.9	3.9	4.1	4.2	4.4	4.6	4.8	5.1	5.4	5.7	6.0	6.3	7.0	7.6	8.1	8.6	9.3	10.1
16.00	3.6	3.6	3.7	3.8	3.9	4.1	4.3	4.5	4.8	5.1	5.3	5.7	6.1	6.5	7.1	7.6	8.1	8.7	9.5
17.00	3.4	3.4	3.5	3.6	3.7	3.9	4.1	4.3	4.5	4.8	5.0	5.3	5.7	6.2	6.7	7.1	7.6	8.2	8.9
18.00	3.2	3.2	3.3	3.4	3.5	3.7	3.8	4.0	4.3	4.5	4.7	5.0	5.4	5.8	6.3	6.7	7.2	7.8	8.4
19.00	3.0	3.1	3.1	3.2	3.3	3.5	3.6	3.8	4.1	4.3	4.5	4.8	5.1	5.5	6.0	6.4	6.8	7.4	8.0
20.00	2.9	2.9	3.0	3.0	3.2	3.3	3.5	3.6	3.8	4.0	4.3	4.5	4.9	5.2	5.7	6.1	6.5	7.0	7.6
25.00	2.3	2.3	2.4	2.4	2.5	2.6	2.8	2.9	3.1	3.2	3.4	3.6	3.9	4.2	4.6	4.9	5.2	5.6	6.1
30.00	1.9	1.9	2.0	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.9	3.0	3.2	3.5	3.8	4.1	4.3	4.7	5.1

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Culminação dos Astros (segundos)

T. 15)

Latitude	Declinação (mesmo nome que o da Latitude)																
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°
0	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
0	.	.	56.23	37.47	28.08	22.44	18.68	15.99	13.97	12.40	11.14	10.10	9.24	8.50	7.88	7.33	6.85
1	.	.	.	56.18	37.42	28.04	22.40	18.64	15.95	13.93	12.36	11.10	10.06	9.20	8.47	84	7.79
2	56.23	.	.	.	56.09	37.35	27.98	22.35	18.59	15.90	13.89	12.31	11.05	10.02	9.16	8.43	80
3	37.47	56.18	.	.	.	55.97	37.26	27.90	22.28	18.53	15.85	13.83	12.26	11.00	97	9.11	8.38
4	28.08	37.42	56.09	.	.	.	55.82	37.15	27.81	22.20	18.45	15.78	13.77	12.20	10.94	92	9.06
5	22.44	28.04	37.35	55.97	.	.	.	55.63	37.01	27.70	22.10	18.37	15.70	13.69	12.13	10.88	9.85
6	18.68	22.40	27.98	37.20	55.82	.	.	.	55.41	36.85	27.57	21.99	18.27	15.61	13.61	12.06	10.81
7	15.99	18.64	22.35	27.90	37.15	55.63	.	.	.	55.15	36.67	27.42	21.87	18.17	15.52	13.53	11.98
8	13.97	15.95	18.59	22.28	27.81	37.01	55.41	.	.	.	54.87	36.47	27.26	21.74	18.05	15.41	13.43
9	12.40	13.93	15.90	18.53	22.20	27.70	36.85	55 15	.	.	.	54.55	36.25	27.09	21.59	17.92	15.30
10	11.14	12.36	13.89	15.85	18.45	22.10	27.57	36.67	54.87	.	.	.	54.20	36.00	26.90	21.43	17.78
11	10.10	11.10	12.31	13.83	15.78	18.37	21.99	27.42	36.47	54.55	.	.	.	53.81	35.73	26.69	21.26
12	9.24	10.06	11.05	12.26	13.77	15.70	18.27	21.87	27.26	36.25	54.20	.	.	.	53.40	35.45	26.47
13	8.50	9.20	10.02	11.00	12.20	13.69	15.61	18.17	21.74	27.09	36.00	53.81	.	.	.	52.95	35.14
14	7.88	8.47	9.16	9.97	10.94	12.13	13.61	15.52	18.05	21.59	26.90	35.73	53.40	.	.	.	52.48
15	7.33	7.84	8.43	9.11	9.92	10.88	12.06	13.53	15.41	17.92	21.43	26.69	35.45	52.95	.	.	.
16	6.85	29	7.80	8.38	06	9.85	10.81	11.98	13.43	15.30	17.78	21.26	26.47	35.14	52.48	.	.
17	42	6.81	25	7.75	8.33	00	9.79	10.73	11.89	13.33	15.17	17.63	21.07	26.23	34.81	51.97	.
18	04	39	6.77	21	7.70	8.27	8.93	9.71	10.65	11.79	13.21	15.04	17.47	20.88	25.98	34.47	51.44
19	5.70	01	35	6.73	16	7.64	21	8.86	9.63	10.56	11.69	13.09	14.90	17.31	20.67	25.71	34.10
20	5.39	5.67	5.97	6.30	6.68	7.10	7.58	8.14	8.79	9.55	10.46	11.58	12.97	14.75	17.13	20.45	25.43
21	12	36	63	5.92	25	6.63	04	7.52	07	8.71	9.46	10.36	11.46	12.83	14.59	16.94	20.22
22	4.86	08	32	58	5.88	20	6.57	6.98	7.45	7.99	8.62	9.37	10.25	11.34	12.69	14.43	16.74
23	63	4.82	04	28	54	5.83	15	51	6.92	38	7.91	8.53	9.27	10.14	11.21	12.54	14.20
24	41	59	4.79	00	23	49	5.77	09	44	6.85	30	7.83	8.44	9.16	10.02	11.08	12.39
25	4.21	4.37	4.55	4.74	4.95	5.18	5.44	5.72	6.03	6.38	6.77	7.22	7.74	8.34	9.05	9.90	10.93
26	03	18	34	51	70	4.91	13	38	5.66	5.96	31	6.69	14	7.64	8.24	8.93	9.77
27	3.85	3.99	14	30	47	65	4.86	08	32	59	5.89	23	6.61	05	7.55	13	8.81
28	69	82	3.95	10	25	42	60	4.80	02	26	53	5.82	15	6.55	6.95	7.44	02
29	54	66	78	3.91	05	21	37	55	4.75	4.96	19	46	5.75	07	44	6.86	7.34
30	3.40	3.51	3.62	3.74	3.87	4.01	4.16	4.32	4.50	4.69	4.90	5.13	5.38	5.67	5.99	6.35	6.70
31	27	37	47	58	70	3.82	3.96	11	27	44	63	4.83	06	31	59	5.90	25
32	14	23	33	43	54	65	78	3.91	05	21	38	56	4.76	4.98	23	50	5.81
33	02	11	20	29	39	49	61	73	3.86	00	15	32	49	69	4.91	15	41
34	2.91	2.99	07	16	25	34	45	56	68	3.80	3.94	09	25	43	02	4.83	00
35	2.80	2.88	2.95	3.03	3.12	3.20	3.30	3.40	3.51	3.62	3.75	3.88	4.03	4.18	4.35	4.54	4.75
36	70	77	84	2.91	2.99	07	16	25	35	46	57	69	3.82	3.96	11	28	46
37	61	67	73	80	87	2.95	03	11	20	30	40	51	63	76	3.89	04	21
38	51	57	63	69	76	83	2.90	2.98	06	15	25	35	45	57	69	3.82	3.97
39	42	48	53	59	65	72	79	86	2.93	01	10	19	29	39	50	62	75
40	2.34	2.39	2.44	2.50	2.55	2.61	2.68	2.74	2.81	2.88	2.96	3.05	3.13	3.23	3.33	3.44	3.55
41	26	31	35	40	46	51	57	63	69	76	83	2.91	2.99	08	17	27	37
42	18	22	27	32	36	42	47	53	58	65	71	78	85	2.93	02	10	20
43	11	15	19	23	28	32	37	42	48	54	60	66	73	80	2.87	2.95	04
44	03	07	11	15	19	24	28	33	38	43	49	55	61	67	74	81	2.89
45	1.96	2.00	2.03	2.07	2.11	2.15	2.19	2.24	2.28	2.33	2.38	2.44	2.49	2.55	2.62	2.68	2.75
46	90	1.93	1.96	00	03	07	11	15	19	24	29	33	39	44	50	56	62
47	83	86	89	1.93	1.96	1.99	03	07	11	15	19	24	28	33	39	44	50
48	77	80	83	86	89	92	1.95	1.99	02	06	10	14	19	23	28	33	38
49	71	73	76	79	82	85	88	91	1.94	1.98	02	05	09	13	18	23	27
50	1.65	1.67	1.70	1.72	1.75	1.78	1.81	1.84	1.87	1.90	1.93	1.97	2.01	2.04	2.08	2.13	2.17
51	59	61	64	66	69	71	74	77	79	82	85	89	1.92	1.96	1.99	03	07
52	53	56	58	60	62	65	67	70	72	75	78	81	84	87	91	1.94	1.98
53	48	50	52	54	56	58	61	63	65	68	71	73	76	79	82	85	89
54	43	45	46	48	50	52	54	57	59	61	64	66	69	71	74	77	80
55	1.37	1.39	1.41	1.43	1.45	1.46	1.48	1.50	1.52	1.55	1.57	1.59	1.62	1.64	1.67	1.69	1.72
56	32	34	36	37	39	41	43	44	46	48	50	52	55	57	59	62	64
57	28	29	30	32	34	35	37	39	40	42	44	46	48	50	52	54	57
58	23	24	25	27	28	30	31	33	35	36	38	40	41	43	45	47	49
59	18	19	21	22	23	25	26	27	29	30	32	34	35	37	39	41	43
60	13	15	16	17	18	19	21	22	23	25	26	28	29	31	32	34	36

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Culminação dos Astros (segundos)

T. 15)

Latitude	Declinação (mesmo nome que o da Lat.)								Declinação (nome differente do da Lat.)							
	17°	18°	19°	20°	21°	22°	23°	24°	1°	2°	3°	4°	5°	6°	7°	8°
0	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
0	6.42	6.04	5.70	5.39	5.12	4.86	4.63	4.41	.	56.23	37.47	28.08	22.44	18.68	15.99	13.97
1	81	39	6.01	67	36	5.08	82	59	56.24	37.49	28.11	22.47	18.71	16.02	14.00	12.43
2	7.25	77	35	97	63	32	5.04	79	37.49	28.11	22.48	18.73	16.04	14.02	12.45	11.19
3	75	7.21	73	6.30	92	58	28	5.00	28.11	22.48	18.73	16.05	14.04	12.47	11.21	10.18
4	8.33	70	7.16	68	6.25	88	54	23	22.47	18.73	16.05	14.04	12.47	11.22	10.19	9.33
5	9.00	8.27	7.64	7.10	6.63	6.20	5.83	5.49	18.71	16.04	14.04	12.47	11.22	10.20	9.34	8.61
6	79	93	8.21	58	7.04	57	6.15	77	16.02	14.02	12.47	11.22	10.19	9.34	8.62	7.99
7	10.73	9.71	86	8.14	52	98	51	6.09	14.00	12.45	11.21	10.19	9.34	8.62	00	46
8	11.89	10.65	9.64	79	8.07	7.45	92	44	12.43	11.19	10.18	9.33	8.61	7.99	7.46	6.99
9	13.33	11.79	10.56	9.55	71	99	7.38	85	11.17	10.16	9.31	8.60	7.99	45	6.98	57
10	15.17	13.21	11.69	10.46	9.46	8.62	7.91	7.30	10.13	9.29	8.58	7.97	7.44	6.98	6.56	6.20
11	17.63	15.04	13.09	11.58	10.36	9.37	8.53	83	9.27	8.56	7.96	43	6.97	56	19	5.86
12	21.07	17.47	14.90	12.97	11.46	10.25	9.27	8.44	8.54	7.93	41	6.95	54	18	5.86	56
13	26.23	20.88	17.31	14.75	12.83	11.34	10.14	9.16	7.91	39	6.93	53	17	5.84	55	29
14	34.81	25.98	20.67	17.13	14.59	12.69	11.21	10.02	36	6.91	51	15	5.83	54	28	04
15	51.97	34.47	25.71	20.45	16.94	14.43	12.54	11.08	6.88	6.48	6.13	5.81	5.52	5.26	5.03	4.81
16	.	51.44	34.10	25.43	20.22	16.74	14.26	12.39	45	10	5.79	51	25	01	4.79	60
17	.	.	50.87	33.71	25.13	19.98	16.54	14.08	08	5.76	48	23	4.99	4.78	58	40
18	.	.	.	50.28	33.31	24.82	19.72	16.32	5.73	46	20	4.97	76	57	39	22
19	50.87	.	.	.	49.66	32.89	24.50	19.46	43	18	4.95	74	55	37	20	05
20	33.71	50.28	.	.	.	49.02	32.45	24.16	5.15	4.92	4.72	4.53	4.35	4.19	4.03	3.89
21	25.13	33.31	49.66	.	.	.	48.35	32.00	4.89	69	50	33	17	02	3.88	74
22	19.98	24.82	32.89	49.02	.	.	.	47.65	66	47	30	14	3.99	3.86	73	61
23	16.54	19.72	24.50	32.45	48.35	.	.	.	44	27	12	3.97	84	71	59	48
24	14.08	16.32	19.46	24.16	32.00	47.65	.	.	24	09	3.95	81	69	57	46	35
25	12.23	13.89	16.10	19.19	23.82	31.53	46.94	.	4.06	3.92	3.79	3.66	3.55	3.44	3.33	3.24
26	10.79	12.06	13.69	15.87	18.90	23.46	31.04	46.20	3.89	76	64	52	41	31	22	13
27	9.63	10.64	11.89	13.49	15.63	18.61	23.09	30.54	73	61	49	39	29	19	11	02
28	8.69	9.50	10.48	11.71	13.28	15.38	18.31	22.70	58	47	36	26	17	08	00	2.92
29	7.90	8.56	9.35	10.32	11.52	13.07	15.12	18.00	43	33	24	15	06	2.98	2.90	83
30	7.23	7.78	8.43	9.20	10.15	11.33	12.84	14.86	3.30	3.21	3.12	3.03	2.95	2.88	2.80	2.74
31	6.65	12	7.65	8.29	9.05	9.98	11.13	12.62	18	09	01	2.93	85	78	71	65
32	15	6.55	00	7.53	8.15	8.89	9.80	10.93	06	2.98	2.90	83	76	69	63	57
33	5.71	05	6.44	6.88	7.39	00	8.73	9.62	2.94	87	80	73	66	60	54	49
34	32	5.61	5.95	32	6.76	7.26	7.85	8.56	84	77	70	64	58	52	46	41
35	4.98	5.23	5.52	5.84	6.21	6.63	7.12	7.70	2.74	2.67	2.61	2.55	2.49	2.44	2.39	2.34
36	67	4.89	14	42	5.73	09	6.50	6.98	64	58	52	47	41	36	31	26
37	38	58	4.80	04	31	5.62	5.97	37	55	49	44	38	33	29	24	20
38	13	30	49	4.70	4.94	20	50	5.84	46	41	36	31	26	22	17	13
39	3.90	05	22	40	61	4.84	10	39	37	32	28	23	19	15	11	07
40	3.68	3.82	3.97	4.13	4.31	4.51	4.74	4.99	2.29	2.25	2.20	2.16	2.12	2.08	2.04	2.00
41	48	61	74	3.89	04	22	41	63	21	17	13	09	05	02	1.98	1.94
42	30	41	53	66	3.80	3.96	13	31	14	10	06	02	1.99	1.95	92	89
43	13	23	34	45	58	72	3.86	03	07	03	1.99	1.96	92	89	86	83
44	2.98	06	16	26	37	50	63	3.77	00	1.96	93	90	86	83	80	77
45	2.83	2.91	2.99	3.09	3.19	3.29	3.41	3.54	1.93	1.90	1.87	1.84	1.81	1.78	1.75	1.72
46	69	76	84	2.92	01	11	21	33	86	83	80	78	75	72	70	67
47	56	63	69	77	2.85	2.94	03	13	80	77	75	72	69	67	64	62
48	44	50	56	63	70	78	2.86	2.95	74	71	69	66	64	62	59	57
49	32	38	44	50	56	63	70	78	68	66	63	61	59	56	54	52
50	2.22	2.27	2.32	2.37	2.43	2.49	2.56	2.63	1.62	1.60	1.58	1.56	1.53	1.51	1.49	1.47
51	11	16	20	25	31	36	42	49	57	55	53	50	48	47	45	43
52	02	06	10	14	19	24	30	35	51	49	47	45	44	42	40	38
53	1.92	1.96	00	04	08	13	18	23	46	44	42	41	39	37	35	34
54	83	87	1.90	1.94	1.98	02	06	11	41	39	37	36	34	33	31	29
55	1.75	1.78	1.81	1.85	1.88	1.92	1.96	2.00	1.36	1.34	1.33	1.31	1.30	1.28	1.27	1.25
56	67	70	73	76	79	82	86	1.89	31	29	28	26	25	24	22	21
57	59	62	64	67	70	73	76	79	26	25	23	22	21	19	18	17
58	52	54	56	59	61	64	67	70	21	20	19	18	16	15	14	13
59	45	47	49	51	53	56	58	61	17	16	14	13	12	11	10	09
60	38	40	41	44	46	48	50	53	12	11	10	09	08	07	06	05

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Cuiminação dos Astros (segundos)

T. 15)

Latitude	Declinação (nome differente do da Latitude)															
	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°
0	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
0	12.40	11.14	10.10	9.24	8.50	7.88	7.33	6.85	6.42	6.04	5.70	5.39	5.12	4.86	4.63	4.41
1	11.17	10.13	9.27	8.54	7.91	36	6.88	45	08	5.73	43	15	4.89	66	44	24
2	10.16	9.29	8.56	7.93	39	6.91	48	10	5.76	46	18	4.92	69	47	27	08
3	9.31	8.58	7.96	41	6.93	51	13	5 76	48	20	4.95	72	50	30	12	3.[illegible]
4	8.60	7.97	7.43	6.95	53	15	5.81	51	23	4.97	74	53	33	14	3.97	81
5	7.99	7.44	6.97	6.54	6.17	5.83	5.52	5.25	4.99	4.76	4.55	4.35	4.17	3.99	3.84	3.69
6	45	6.98	56	18	5.84	54	26	01	78	57	37	19	02	86	71	57
7	6.98	56	19	5.86	55	28	03	4.79	58	39	20	03	3.88	73	59	46
8	57	20	5.86	56	29	04	4.81	60	40	22	05	3.89	74	61	48	35
9	20	5.87	57	29	04	4.82	61	41	23	06	3.91	76	62	49	37	25
10	5.87	5.57	5.30	5.05	4.82	4.61	4.42	4.24	4.07	3.92	3.77	3.63	3.51	3.38	3.27	3.16
11	57	30	05	4.83	62	43	25	08	3.93	78	64	52	40	28	17	07
12	29	05	4.83	62	43	25	09	3.93	79	65	53	41	29	18	08	2.99
13	04	4.82	62	43	25	09	3.94	79	66	53	41	30	19	09	00	90
14	4.82	61	43	25	09	3.94	80	66	54	42	31	20	10	01	2.91	83
15	4.61	4.42	4.25	4.09	3.94	3.80	3.66	3.54	3.42	3.31	3.21	3.11	3.01	2.92	2.84	2.75
16	41	24	08	3.93	79	66	54	42	31	21	11	02	2.93	84	76	68
17	23	07	3.93	79	66	54	42	31	21	11	02	2.93	85	77	69	61
18	06	3.92	78	65	53	42	31	21	11	02	2.93	85	77	69	62	55
19	3.91	77	64	53	41	31	21	11	02	2.93	85	77	70	62	55	49
20	3.76	3.63	3.52	3.41	3.30	3.20	3.11	3.02	2.93	2.85	2.77	2.70	2.63	2.56	2.49	2.43
21	62	51	40	29	19	10	01	2.93	85	77	70	63	56	49	43	37
22	49	38	28	18	09	01	2.92	84	77	69	62	56	49	43	37	31
23	37	27	17	08	00	2.91	84	76	69	62	55	49	43	37	31	26
24	25	16	07	2.99	2.90	83	75	68	61	55	49	43	37	31	26	21
25	3.14	3.06	2.97	2.89	2.82	2.74	2.67	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.20	2.15
26	04	2.96	88	80	73	66	60	54	47	42	36	31	25	20	15	10
27	2.94	86	79	72	65	59	53	47	41	35	30	25	20	15	10	06
28	85	77	70	64	57	51	46	40	34	29	24	19	14	10	05	01
29	76	69	62	56	50	44	39	33	28	23	18	14	09	05	01	1.96
30	2.67	2.61	2.54	2.49	2.43	2.38	2.32	2.27	2.22	2.18	2.13	2.09	2.04	2.00	1.96	1.92
31	59	53	47	41	36	31	26	21	17	12	08	04	1.99	1.95	91	88
32	51	45	40	34	29	25	20	15	11	07	03	1.99	95	91	87	83
33	43	38	33	28	23	18	14	10	06	02	1.98	94	90	86	83	79
34	36	31	26	21	17	13	08	04	00	1.96	93	89	86	82	77	73
35	2.29	2.24	2.19	2.15	2.11	2.07	2.03	1.99	1.95	1.92	1.88	1.85	1.81	1.78	1.75	1.71
36	22	17	13	09	05	01	1.97	94	90	87	83	80	77	74	71	68
37	15	11	07	03	1.99	1.96	92	89	85	82	79	76	73	70	67	64
38	09	05	01	1.98	94	91	87	84	81	77	74	71	69	66	63	60
39	03	1.99	1.96	92	89	85	82	79	76	73	70	67	64	62	59	56
40	1.97	1.93	1.90	1.87	1.84	1.80	1.77	1.74	1.72	1.69	1.66	1.63	1.61	1.58	1.55	1.53
41	91	88	85	81	78	76	73	70	67	64	62	59	57	54	52	49
42	85	82	79	76	74	71	68	65	63	60	58	55	53	51	48	46
43	80	77	74	71	69	66	64	61	59	56	54	51	49	47	45	43
44	75	72	69	67	64	62	59	57	54	52	50	48	45	43	41	39
45	1.70	1.67	1.64	1.62	1.60	1.57	1.55	1.53	1.50	1.48	1.46	1.44	1.42	1.40	1.38	1.36
46	64	62	60	57	55	53	51	48	46	44	42	40	38	36	34	33
47	60	57	55	53	51	49	46	44	42	40	39	37	35	33	31	29
48	55	53	50	48	46	44	42	41	39	37	35	33	31	30	28	26
49	50	48	46	44	42	40	38	37	35	33	31	30	28	26	25	23
50	1.45	1.44	1.42	1.40	1.38	1.36	1.35	1.33	1.31	1.29	1.28	1.26	1.25	1.23	1.21	1.20
51	41	39	37	36	34	32	31	29	27	26	24	23	21	20	18	17
52	37	35	33	32	30	28	27	25	24	22	21	19	18	17	15	14
53	32	31	29	28	26	25	23	22	20	19	17	16	15	13	12	11
54	28	26	25	24	22	21	19	18	17	15	14	13	12	10	09	08
55	1.24	1.22	1.21	1.20	1.18	1.17	1.16	1.14	1.13	1.12	1.11	1.10	1.08	1.07	1.06	1.05
56	20	18	17	16	15	13	12	11	10	09	07	06	05	04	03	02
57	16	14	13	12	11	10	09	07	06	05	04	03	02	01	00	0.99
58	12	11	09	08	07	06	05	04	03	02	01	00	0.99	0.98	0.97	96
59	08	07	06	05	04	03	02	01	00	0.99	0.98	0.97	96	95	94	93
60	04	03	02	01	00	0.99	0.98	0.97	0.96	95	95	94	93	92	91	90

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T. 15-a) Quadrados dos Angulos no Polo

s	Intervallo entre o meio dia verdadeiro e a hora da observação														
	0ᵐ	1ᵐ	2ᵐ	3ᵐ	4ᵐ	5ᵐ	6ᵐ	7ᵐ	8ᵐ	9ᵐ	10ᵐ	11ᵐ	12ᵐ	13ᵐ	14ᵐ
0	0.0	1.0	4.0	9.0	16.0	25.0	36.0	49.0	64.0	81.0	100.0	121.0	144.0	169.0	196.0
1	0	0	1	1	1	2	2	2	3	3	3	4	4	4	5
2	0	1	1	2	2	3	4	5	5	6	7	7	8	9	197.0
3	0	1	2	3	4	5	6	7	8	9	101.0	122.1	145.2	170.3	4
4	0	1	3	4	5	7	8	9	65.1	82.2	3	5	6	7	9
5	0.0	1.2	4.3	9.5	16.7	25.8	37.0	50.2	65.3	82.5	101.7	122.9	146.0	171.2	198.4
6	0	2	4	6	8	26.0	2	4	6	8	102.0	123.2	4	6	8
7	0	3	5	7	9	2	4	6	9	83.1	3	6	8	172.0	199.3
8	0	3	6	8	17.1	3	6	9	66.1	4	7	124.0	147.2	4	8
9	0	3	6	9	2	5	8	51.1	4	7	103.0	3	6	9	200.2
10	0.0	1.4	4.7	10.0	17.4	26.7	38.0	51.4	66.7	84.0	103.4	124.7	148.0	173.3	200.7
11	0	4	8	1	5	9	2	6	67.0	3	7	125.1	4	8	201.2
12	0	4	8	2	6	27.0	4	8	2	6	104.0	4	8	174.2	6
13	0	5	9	3	8	2	6	52.1	5	9	4	8	149.2	6	202.1
14	1	5	5.0	4	9	4	8	3	8	85.3	7	126.2	7	175.0	6
15	0.1	1.6	5.1	10.6	18.1	27.6	39.0	52.5	68.1	85.6	105.1	126.6	150.1	175.5	203.1
16	1	6	1	7	2	7	3	8	3	9	4	9	5	9	6
17	1	6	2	8	3	9	5	53.1	6	86.2	7	127.3	9	176.4	204.0
18	1	7	3	9	5	28.1	7	3	9	5	106.1	7	151.3	9	5
19	1	7	4	11.0	6	3	9	5	69.2	8	4	128.1	7	177.4	205.0
20	0.1	1.8	5.4	11.1	18.8	28.4	40.1	53.8	69.4	87.1	106.8	128.4	152.1	177.8	205.5
21	1	8	5	2	9	6	3	54.0	7	4	107.1	8	5	178.3	206.0
22	1	1.9	6	3	19.1	8	5	3	70.0	7	5	129.2	9	7	4
23	1	9	7	4	2	29.0	7	5	3	88.0	8	6	153.3	179.2	9
24	2	2.0	8	6	4	2	41.0	8	6	4	108.2	130.0	8	6	207.4
25	0.2	2.0	5.8	11.7	19.5	29.3	41.2	55.0	70.8	88.7	108.5	130.3	154.2	180.0	207.9
26	2	1	9	8	7	5	4	3	71.1	89.0	9	7	6	5	208.4
27	2	1	6.0	9	8	7	6	5	4	3	109.2	131.1	155.0	9	9
28	2	2	1	12.0	9	9	8	8	7	6	6	5	4	181.4	209.4
29	2	2	2	1	20.1	30.1	42.0	56.0	72.0	9	9	9	8	8	8
30	0.3	2.3	6.3	12.3	20.3	30.3	42.3	56.3	72.3	90.3	110.3	132.2	156.2	182.3	210.2
31	3	3	3	4	4	4	5	5	5	6	6	6	7	8	7
32	3	4	4	5	5	6	7	7	8	9	111.0	133.0	157.1	183.2	211.2
33	3	4	5	6	7	8	9	57.0	73.1	91.2	3	4	5	7	7
34	3	5	6	7	8	31.0	43.1	3	4	5	7	8	9	184.1	212.2
35	0.3	2.5	6.7	12.8	21.0	31.2	43.3	57.5	73.7	91.8	112.0	134.2	158.3	184.6	212.7
36	4	6	8	13.0	2	4	6	8	74.0	92.2	4	6	8	185.0	213.1
37	4	6	9	1	3	5	8	58.0	3	5	7	9	159.2	5	6
38	4	7	9	2	5	7	44.0	3	5	8	113.1	135.3	6	9	214.1
39	4	7	7.0	3	6	9	2	5	8	93.1	4	7	160.0	186.4	6
40	0.4	2.8	7.1	13.4	21.8	32.1	44.4	58.8	75.1	93.4	113.8	136.1	160.4	186.8	215.0
41	5	8	2	6	9	3	7	59.0	4	8	114.1	5	9	187.3	5
42	5	9	3	7	22.1	5	9	3	7	94.1	5	9	161.3	8	216.0
43	5	9	4	8	2	7	45.1	5	76.0	4	8	137.3	7	188.2	5
44	5	3.0	5	9	4	9	3	8	3	7	115.2	7	162.1	7	217.0
45	0.6	3.1	7.6	14.1	22.6	33.1	45.5	60.0	76.6	95.1	115.6	138.1	162.6	189.1	217.5
46	6	1	7	2	7	3	8	3	8	4	9	5	163.0	6	218.0
47	6	2	7	3	9	4	46.0	6	77.1	7	116.3	8	4	190.0	5
48	6	2	8	4	23.0	6	2	8	4	96.0	6	139.2	8	5	219.0
49	7	3	9	6	2	8	5	61.1	7	4	117.0	6	164.3	9	5
50	0.7	3.4	8.0	14.7	23.4	34.0	46.7	61.4	78.0	96.7	117.4	140.0	164.7	191.4	220.0
51	7	4	1	8	5	2	9	6	3	97.0	7	4	165.1	8	5
52	8	5	2	15.0	7	4	47.2	9	6	4	118.1	8	6	192.3	221.0
53	8	5	3	1	8	6	4	62.1	9	7	4	141.2	166.0	7	5
54	8	6	4	2	24.0	8	6	4	79.2	98.0	8	6	4	193.2	222.0
55	0.8	3.7	8.5	15.3	24.2	35.0	47.8	62.7	79.5	98.3	119.2	142.0	166.8	193.6	222.5
56	9	7	6	5	3	2	48.1	9	8	7	5	4	167.3	194.1	223.0
57	9	8	7	6	5	4	3	63.2	80.1	99.0	9	8	7	5	5
58	9	8	8	7	7	6	5	5	4	3	120.3	143.2	168.1	195.0	224.0
59	1.0	9	9	9	8	8	8	7	7	7	6	6	6	5	5

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T. 16)

Declinação

Lat.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	Lat.
0	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	0
0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	0
2	0	0	0	0	5 59	5 59	5 59	5 59	5 59	5 59	5 59	5 58	5 58	5 58	5 58	5 58	5 58	5 58	2
4	0	0	5 59	5 59	59	59	58	58	58	57	57	57	57	56	56	56	55	55	4
6	0	0	59	59	58	58	57	57	57	56	56	55	55	54	54	54	53	53	6
8	0	5 59	59	58	58	57	57	56	55	55	54	54	53	53	52	51	51	50	8
10	6 0	5 59	5 59	5 58	5 57	5 56	5 56	5 55	5 54	5 54	5 53	5 52	5 51	5 51	5 50	5 49	5 48	5 48	10
11	0	59	58	58	57	56	55	55	54	53	52	51	51	50	49	48	47	46	11
12	0	59	58	58	57	56	55	54	53	52	51	51	50	49	48	47	46	45	12
13	0	59	58	57	56	55	54	54	53	52	51	50	49	48	47	46	45	44	13
14	0	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	14
15	6 0	5 59	5 58	5 57	5 56	5 55	5 54	5 53	5 51	5 50	5 49	5 48	5 47	5 46	5 45	5 44	5 42	5 41	15
16	0	59	58	57	55	55	53	52	51	50	48	47	46	45	44	42	41	40	16
17	0	59	58	56	55	55	53	51	50	49	48	47	45	44	43	41	40	39	17
18	0	59	57	56	55	53	52	51	50	48	47	46	44	43	41	40	39	37	18
19	0	59	57	56	54	53	52	50	49	48	46	45	43	42	40	39	37	36	19
20	6 0	5 59	5 57	5 56	54	5 53	5 51	5 50	5 48	5 47	5 45	5 44	5 42	5 41	5 39	5 38	5 36	5 34	20
21	0	58	57	55	54	52	51	49	48	46	44	43	41	40	38	36	35	33	21
22	0	58	57	55	54	52	50	49	47	45	44	42	40	39	37	35	33	32	22
23	0	58	57	55	53	51	50	48	47	45	43	41	39	38	36	34	32	30	23
24	0	58	56	55	53	51	49	47	46	44	42	40	38	36	34	33	31	29	24
25	6 0	5 58	5 56	5 54	5 53	5 51	5 49	5 47	5 45	5 43	5 41	5 39	5 37	5 35	5 33	5 31	5 29	5 27	25
26	0	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	26
27	0	58	56	54	52	50	48	46	44	41	39	37	35	33	31	29	26	24	27
28	0	58	56	54	51	49	47	45	43	41	38	36	34	32	30	27	25	23	28
29	0	58	56	53	51	49	47	44	42	40	38	35	33	31	28	26	23	21	29
30	6 0	5 58	5 55	5 53	5 51	5 48	5 46	5 44	5 41	5 39	5 37	5 34	5 32	5 29	5 27	5 24	5 22	5 19	30
31	0	58	55	53	50	48	46	43	41	38	36	33	31	28	26	23	20	18	31
32	0	58	55	53	50	47	45	42	40	37	35	32	29	27	24	21	19	16	32
33	0	57	55	52	50	47	45	42	39	36	34	31	28	26	23	20	17	14	33
34	0	57	55	52	49	46	44	41	38	35	33	30	27	24	21	18	15	12	34
35	6 0	5 57	5 54	5 52	5 49	5 46	5 43	5 40	5 37	5 35	5 32	5 29	5 26	5 23	5 20	5 17	5 14	5 11	35
36	0	57	54	51	48	45	42	40	37	34	31	28	24	21	18	15	12	9	36
37	0	57	54	51	48	45	42	39	36	33	29	26	23	20	17	13	10	7	37
38	0	57	51	51	47	44	41	38	35	32	28	25	22	18	15	12	8	5	38
39	0	57	54	50	47	44	40	37	34	31	27	24	20	17	13	10	6	3	39
40	6 0	5 57	5 53	5 50	5 47	5 43	5 40	5 36	5 33	5 29	5 26	5 22	5 19	5 15	5 12	5 8	5 4	5 1	40
41	0	57	53	50	46	43	39	35	32	28	25	21	17	14	10	6	2	4 58	41
42	0	56	53	49	46	42	38	35	31	27	23	20	16	12	8	4	0	56	42
43	0	56	53	49	45	41	38	34	30	26	22	18	14	10	6	2	4 58	54	43
44	0	56	52	48	45	41	37	33	29	25	21	17	13	8	4	0	56	51	44
45	6 0	5 56	5 52	5 48	5 44	5 40	5 36	5 32	5 28	5 24	5 19	5 15	5 11	5 7	5 2	4 58	4 53	4 49	45
46	0	56	52	48	43	39	35	31	27	22	18	14	9	5	0	56	51	46	46
47	0	56	51	47	43	39	34	30	25	21	16	12	7	3	4 58	53	48	43	47
48	0	56	51	47	42	38	33	29	24	19	15	10	5	1	56	51	46	41	48
49	0	55	51	46	42	37	32	28	23	18	13	8	3	4 58	53	48	43	38	49
50	6 0	5 55	5 50	5 46	5 41	5 36	5 31	5 26	5 21	5 16	5 11	5 6	5 1	4 56	4 51	4 46	4 40	4 35	50
51	0	55	50	45	40	35	30	25	20	15	10	4	4 59	54	48	43	37	31	51
52	0	55	50	45	39	34	29	24	19	13	8	2	57	51	46	40	34	28	52
53	0	55	49	44	39	33	28	22	17	11	6	0	54	49	43	37	31	24	53
54	0	55	49	44	38	32	27	21	15	10	4	4 58	52	46	46	33	27	20	54
55	6 0	5 54	5 49	5 43	5 37	5 31	5 25	5 20	5 14	5 8	5 2	4 56	4 49	4 43	4 37	4 30	4 23	4 16	55
56	0	54	48	42	36	30	24	18	12	6	4 59	53	47	40	33	26	19	12	56
57	0	54	48	41	35	29	23	16	10	4	57	50	44	37	30	23	15	8	57
58	0	54	47	41	34	28	21	15	8	1	54	48	41	33	26	18	11	3	58
59	0	53	47	40	33	27	20	13	6	4 59	52	44	37	30	22	14	6	3 58	59
60	6 0	5 53	5 46	5 39	5 32	5 25	5 18	5 11	5 4	4 56	4 49	4 41	4 34	4 26	4 18	4 9	4 1	3 52	60
61	0	53	46	38	31	24	16	9	1	54	46	38	30	22	13	4	3 55	46	61
62	0	52	45	37	30	22	14	6	4 59	51	43	34	26	17	8	3 59	49	40	62
63	0	52	44	36	28	20	12	4	56	48	39	30	21	12	3	53	43	33	63
64	0	52	44	35	27	19	10	2	53	45	35	26	17	7	3 57	47	36	25	64
65	0	51	43	34	26	18	8	0	50	41	31	21	12	1	51	40	28	16	65

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T. 16)

Declinação

Lat.	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°	Lat.
o	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	o
0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	0
2	5 57	5 57	5 57	5 57	5 57	5 57	5 56	5 56	5 56	5 56	5 56	5 56	5 55	5 55	5 55	5 55	5 55	5 54	2
4	55	54	54	54	54	53	53	53	52	52	51	51	51	50	50	50	49	49	4
6	52	52	51	51	50	50	49	49	48	48	47	47	46	46	45	44	44	43	6
8	50	49	48	48	47	46	46	45	41	44	43	42	41	41	40	39	38	37	8
10	5 47	5 46	5 45	5 44	5 44	5 43	5 42	5 41	5 40	5 39	5 38	5 38	5 37	5 36	5 35	5 34	5 33	5 32	10
11	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	11
12	44	43	42	41	40	39	38	37	36	35	34	33	32	31	29	28	27	26	12
13	43	42	41	40	39	38	36	35	34	33	32	31	29	28	27	26	24	23	13
14	41	40	39	38	37	36	35	33	32	31	30	28	27	26	24	23	21	20	14
15	5 40	5 39	5 38	5 36	5 35	5 34	5 33	5 31	5 30	5 29	5 27	5 26	5 24	5 23	5 21	5 20	5 18	5 17	15
16	39	37	36	35	33	32	31	29	28	26	25	23	22	20	19	17	15	14	16
17	37	36	34	33	32	30	29	27	26	24	23	21	19	18	16	14	12	11	17
18	36	34	33	31	30	28	27	25	24	22	20	18	17	15	15	11	9	7	18
19	34	33	31	30	28	26	25	23	21	20	18	16	14	12	10	8	6	4	19
20	5 33	5 31	5 30	5 28	5 26	5 24	5 23	5 21	5 19	5 17	5 15	5 13	5 11	5 9	5 7	5 5	5 3	5 1	20
21	31	30	28	26	24	22	21	19	17	15	13	11	9	7	4	2	0	4 58	21
22	30	28	26	24	22	21	19	17	15	12	10	8	6	4	2	4 59	4 57	54	22
23	28	26	24	22	21	19	16	14	12	10	8	6	3	1	4 59	56	53	51	23
24	27	25	23	21	19	16	14	12	10	8	5	3	0	4 58	55	53	50	47	24
25	5 25	5 23	5 21	5 19	5 17	5 14	5 12	5 10	5 7	5 5	5 3	5 0	4 58	4 55	4 52	4 50	4 47	4 44	25
26	24	21	19	17	15	12	10	7	5	2	0	4 57	55	52	49	46	43	40	26
27	22	20	17	15	12	10	8	5	2	0	4 57	54	52	49	46	43	40	36	27
28	20	18	15	13	10	8	5	3	0	4 57	54	51	48	45	42	39	36	33	28
29	18	16	13	11	8	6	3	0	4 57	54	51	48	45	42	39	36	32	29	29
30	5 17	5 14	5 11	5 9	5 6	5 3	5 0	4 58	4 55	4 52	4 48	4 45	4 42	4 39	4 35	4 32	4 28	4 25	30
31	15	12	9	7	4	1	4 58	55	52	49	46	42	39	35	32	28	24	20	31
32	13	10	7	4	2	4 59	55	52	49	46	42	39	35	32	28	24	20	16	32
33	11	8	5	2	4 59	56	53	49	46	43	39	36	32	28	24	20	16	12	33
34	9	6	3	0	57	53	50	47	43	40	36	32	28	24	20	16	12	7	34
35	5 7	5 4	5 1	4 58	4 54	4 51	4 47	4 44	4 40	4 36	4 33	4 29	4 25	4 20	4 16	4 12	4 7	4 3	35
36	5	2	4 59	55	52	48	44	41	37	33	29	25	21	16	12	7	3	3 58	36
37	3	0	56	53	49	45	42	38	34	30	26	21	17	12	8	3	3 58	53	37
38	1	4 58	54	50	46	43	39	35	30	26	22	17	13	8	3	3 58	53	47	38
39	4 59	55	51	48	44	40	35	31	27	23	18	13	9	4	3 58	53	48	42	39
40	4 57	4 53	4 49	4 45	4 41	4 37	4 32	4 28	4 23	4 19	4 14	4 9	4 4	3 59	3 54	3 48	3 42	3 36	40
41	54	50	46	42	38	33	29	24	20	15	10	5	0	54	48	43	36	30	41
42	52	48	43	39	35	30	25	21	16	11	5	0	4 55	49	43	37	30	24	42
43	49	45	41	36	31	27	22	17	12	7	1	3 56	50	44	37	31	24	17	43
44	47	42	38	33	28	23	18	13	8	2	3 56	51	44	38	32	25	17	10	44
45	4 44	4 39	4 35	4 30	4 25	4 20	4 14	4 9	4 3	3 57	3 52	3 45	3 39	3 32	3 25	3 18	3 10	3 2	45
46	41	36	31	26	21	16	10	5	3 59	53	46	40	33	26	19	11	3	2 54	46
47	38	33	28	23	17	12	6	0	54	48	41	34	27	20	12	3	2 55	45	47
48	35	30	25	19	13	7	1	3 55	49	42	35	28	20	13	4	2 55	46	36	48
49	32	27	21	15	9	3	3 57	50	43	36	29	22	14	5	2 56	47	36	25	49
50	4 29	4 23	4 17	4 11	4 5	3 58	3 52	3 45	3 38	3 30	3 23	3 15	3 6	2 57	2 47	2 37	2 26	2 14	50
51	25	19	13	7	0	54	47	39	32	24	16	7	2 58	48	38	27	14	1	51
52	22	15	9	2	3 55	48	41	33	25	17	8	2 59	49	39	28	15	1	1 45	52
53	18	11	4	3 58	50	43	35	27	19	10	0	51	40	28	16	2	1 46	27	53
54	14	7	0	52	45	37	29	20	11	2	2 52	41	30	17	3	1 47	27	2	54
55	4 9	4 2	3 55	3 47	3 39	3 31	3 22	3 13	3 3	2 53	2 42	2 31	2 18	2 4	1 47	1 28	1 2	0 0	55
56	5	3 57	49	41	33	24	15	5	2 55	44	32	19	5	1 48	28	3	0 0		56
57	0	52	44	35	26	17	7	2 56	45	33	20	6	1 49	29	3	0 0			57
58	3 55	46	38	28	19	9	2 58	47	35	22	7	1 50	30	4	0 0				58
59	49	40	31	21	11	0	49	36	23	8	1 51	31	4	0 0					59
60	3 43	3 34	3 24	3 15	3 2	2 51	2 38	2 25	2 9	1 52	1 32	1 5	0 0						60
61	36	26	16	5	2 53	40	26	11	1 53	33	6	0 0							61
62	29	18	7	2 55	42	28	13	1 55	34	6	0 0								62
63	22	10	2 58	44	30	14	1 56	35	7	0 0									63
64	13	0	47	32	16	1 58	36	8	0 0										64
65	3	2 50	35	18	0	39	0	0 0											65

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T. 17) Amplitudes

Lat.	Declinação 0°	1°	2°	3°	4°	5°	6°	7°	8°	8° 30′	9°	9° 30′	10°	10° 30′	11°	11° 30′	12°	12° 30′	13°	13° 30′
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5
10	0.0	1.0	2.0	3.0	4.1	5.1	6.1	7.1	8.1	8.6	9.1	9.7	10.1	10.7	11.2	11.7	12.2	12.7	13.2	13.7
15	0.0	1.0	2.1	3.1	4.2	5.2	6.2	7.2	8.3	8.8	9.3	9.8	10.4	10.9	11.4	11.9	12.5	12.9	13.5	14.0
20	0.0	1.1	2.1	3.2	4.3	5.3	6.4	7.5	8.5	9.1	9.6	10.1	10.6	11.2	11.7	12.3	12.8	13.3	13.8	14.4
25	0.0	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.4	9.9	10.5	11.1	11.6	12.4	12.7	13.3	13.8	14.4	14.9
30	0.0	1.2	2.3	3.4	4.6	5.8	6.9	8.1	9.3	9.8	10.3	11.0	11.6	12.2	12.7	13.3	13.9	14.5	15.0	15.6
32	0.0	1.2	2.4	3.5	4.7	5.9	7.1	8.3	9.5	10.0	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.4	16.0
34	0.0	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.7	10.3	10.8	11.5	12.1	12.7	13.3	13.9	14.5	15.1	15.7	16.4
35	0.0	1.2	2.4	3.7	4.9	6.1	7.3	8.5	9.8	10.4	11.0	11.6	12.2	12.9	13.5	14.1	14.7	15.3	15.9	16.6
36	0.0	1.2	2.5	3.7	4.9	6.2	7.4	8.7	9.9	10.5	11.1	11.8	12.4	13.0	13.6	14.3	14.9	15.5	16.1	16.8
37	0.0	1.2	2.5	3.7	5.0	6.3	7.5	8.8	10.0	10.7	11.3	11.9	12.6	13.2	13.8	14.5	15.1	15.7	16.4	17.0
38	0.0	1.3	2.5	3.8	5.1	6.3	7.6	8.9	10.2	10.8	11.4	12.1	12.7	13.4	14.0	14.7	15.3	16.0	16.6	17.2
39	0.0	1.3	2.6	3.8	5.1	6.4	7.7	9.0	10.3	11.0	11.6	12.3	12.9	13.6	14.2	14.9	15.5	16.2	16.8	17.5
40	0.0	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.5	11.1	11.8	12.5	13.1	13.8	14.4	15.1	15.7	16.4	17.1	17.8
41	0.0	1.3	2.6	4.0	5.3	6.6	8.0	9.3	10.6	11.3	12.0	12.6	13.3	14.0	14.6	15.3	16.0	16.7	17.3	18.0
42	0.0	1.3	2.7	4.0	5.4	6.7	8.1	9.4	10.8	11.5	12.1	12.8	13.5	14.2	14.8	15.6	16.2	16.9	17.6	18.3
43	0.0	1.4	2.7	4.1	5.5	6.8	8.2	9.6	11.0	11.7	12.3	13.0	13.7	14.4	15.1	15.8	16.5	17.2	17.9	18.6
44	0.0	1.4	2.8	4.2	5.6	7.0	8.3	9.7	11.1	11.9	12.6	13.3	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9
45	0.0	1.4	2.8	4.2	5.7	7.1	8.5	9.9	11.3	12.1	12.8	13.5	14.2	14.9	15.6	16.4	17.1	17.8	18.5	19.3
46	0.0	1.4	2.9	4.3	5.8	7.2	8.6	10.1	11.5	12.3	13.0	13.8	14.5	15.2	15.9	16.7	17.4	18.2	18.9	19.6
47	0.0	1.4	2.9	4.4	5.8	7.3	8.8	10.3	11.8	12.5	13.3	14.0	14.7	15.5	16.2	17.0	17.7	18.5	19.3	20.0
48	0.0	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	12.8	13.5	14.3	15.0	15.8	16.6	17.3	18.1	18.9	19.5	20.4
49	0.0	1.5	3.0	4.6	6.1	7.6	9.2	10.7	12.2	13.0	13.8	14.6	15.3	16.1	16.9	17.7	18.5	19.3	20.0	20.9
50	0.0	1.5	3.1	4.7	6.2	7.8	9.3	10.9	12.5	13.3	14.1	14.9	15.7	16.5	17.3	18.1	18.9	19.7	20.5	21.3
51	0.0	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.5	19.3	20.1	20.9	21.8
52	0.0	1.6	3.3	4.9	6.5	8.1	9.7	11.4	13.1	13.9	14.7	15.6	16.4	17.2	18.0	18.9	19.7	20.6	21.4	22.3
53	0.0	1.6	3.3	5.0	6.7	8.3	10.0	11.7	13.4	14.2	15.1	15.9	16.8	17.6	18.5	19.4	20.2	21.1	21.9	22.8
54	0.0	1.7	3.4	5.1	6.8	8.5	10.2	12.0	13.7	14.6	15.4	16.3	17.2	18.1	18.9	19.8	20.7	21.6	22.5	23.4
55	0.0	1.7	3.5	5.2	7.0	8.7	10.5	12.3	14.0	14.9	15.8	16.7	17.6	18.5	19.4	20.3	21.2	22.2	23.1	24.0
56	0.0	1.8	3.6	5.4	7.2	9.0	10.7	12.6	14.4	15.3	16.2	17.2	18.1	19.0	19.9	20.9	21.8	22.8	23.7	24.7
57	0.0	1.8	3.7	5.5	7.4	9.2	11.1	12.9	14.8	15.8	16.7	17.7	18.3	19.6	20.5	21.5	22.4	23.4	24.4	25.4
58	0.0	1.9	3.8	5.7	7.6	9.5	11.4	13.3	15.2	16.2	17.2	18.1	19.1	20.1	21.1	22.1	23.1	24.1	25.1	26.1
59	0.0	1.9	3.8	5.8	7.8	9.7	11.7	13.7	15.7	16.7	17.7	18.7	19.7	20.7	21.7	22.8	23.8	24.9	25.9	26.9
60	0.0	2.0	4.0	6.0	8.0	10.0	12.1	14.1	16.2	17.2	18.2	19.3	20.3	21.4	22.4	23.5	24.6	25.6	26.7	27.8
61	0.0	2.1	4.1	6.2	8.3	10.3	12.5	14.6	16.7	17.8	18.8	19.9	21.0	22.1	23.1	24.3	25.4	26.5	27.6	28.8
62	0.0	2.1	4.3	6.4	8.5	10.7	12.9	15.1	17.3	18.4	19.4	20.6	21.9	22.9	23.9	25.1	26.3	27.5	28.5	29.8
63	0.0	2.2	4.5	6.7	8.8	11.1	13.4	15.6	17.9	19.0	20.1	21.3	22.5	23.7	24.8	26.1	27.3	28.5	29.6	31.0
64	0.0	2.3	4.6	6.9	9.1	11.5	13.9	16.2	18.5	19.7	20.9	22.1	23.3	24.6	25.7	27.1	28.3	29.6	30.9	32.2
65	0.0	2.4	4.8	7.1	9.5	11.9	14.4	16.8	19.3	20.5	21.7	23.0	24.2	25.7	26.8	28.2	29.5	30.8	32.5	33.5

T. 18) Correcção da declinação do sol

Augmenta a decl. { Somma nas long.ᵉ W. / Subtrahe nas long.ᵉ E.

Diminue a decl. { Subtrahe nas long.ᵉ W. / Somma nas long.ᵉ E.

Long.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	23° 30
°	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
30	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	0
40	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	0
50	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	1	1	1	0
60	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	2	2	2	1	1	0
70	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	2	2	2	1	0
80	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	3	3	3	2	2	1	0
90	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	4	4	4	4	3	3	2	1	0
100	7	7	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	4	4	4	3	2	1	0
110	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	5	5	5	4	4	3	3	1	0
120	8	8	8	8	8	8	8	7	7	7	7	7	7	7	6	6	6	5	5	5	4	4	3	2	0
130	9	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	6	6	6	5	5	4	3	2	0
140	9	9	9	9	9	9	9	9	9	9	8	8	8	8	7	7	7	6	6	6	5	4	3	2	0
150	10	10	10	10	10	10	10	9	9	9	9	9	9	8	8	8	7	7	6	6	5	5	4	2	0
160	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	8	8	7	7	6	6	5	4	2	0
170	11	11	11	11	11	11	11	10	10	10	10	10	10	9	9	9	8	8	7	7	6	5	4	2	0
180	12	12	12	12	12	12	11	11	11	11	11	11	10	10	10	9	9	8	8	7	6	5	4	2	0

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T. 17) Amplitudes

Lat.	Declinação 14°	14°.5	15°	15°.5	16°	16°.5	17°	17°.5	18°	18°.5	19°	19°.5	20°	20°.5	21°	21°.5	22°	22°.5	23°	23°.5	Lat.
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	
0	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.1	20.5	21.0	21.5	22.0	22.5	23.0	23.5	0
10	14.2	14.7	15.3	15.8	16.3	16.8	17.3	17.8	18.3	18.8	19.3	19.8	20.3	20.8	21.4	21.9	22.4	22.9	23.4	23.9	10
15	14.5	15.0	15.5	16.1	16.6	17.1	17.6	18.1	18.7	19.2	19.7	20.2	20.7	21.3	21.8	22.3	22.8	23.3	23.9	24.4	15
20	14.9	15.5	16.0	16.5	17.1	17.6	18.1	18.7	19.2	19.7	20.3	20.8	21.4	21.9	22.4	23.0	23.5	24.4	24.6	25.1	20
25	15.5	16.1	16.6	17.2	17.7	18.3	18.8	19.4	19.9	20.5	21.1	21.6	22.2	22.7	23.3	23.9	24.4	25.0	25.5	26.1	25
30	16.2	16.8	17.4	18.0	18.6	19.2	19.7	20.3	20.9	21.5	22.1	22.7	23.3	23.9	24.5	25.0	25.6	26.2	26.8	27.4	30
32	16.6	17.2	17.8	18.4	19.0	19.6	20.2	20.8	21.4	22.0	22.6	23.2	23.8	24.4	25.0	25.6	26.2	26.8	27.4	28.1	32
34	17.0	17.6	18.2	18.8	19.4	20.0	20.7	21.3	21.9	22.5	23.1	23.8	24.4	25.0	25.0	26.2	26.9	27.5	28.1	28.8	34
35	17.2	17.8	18.6	19.0	19.7	20.3	20.9	21.5	22.2	22.8	23.4	24.1	24.7	25.3	21.6	26.6	27.2	27.9	28.5	29.1	35
36	17.4	18.0	18.7	19.3	19.9	20.5	21.2	21.8	22.5	23.1	23.7	24.4	25.0	25.6	26.3	26.9	27.6	28.2	28.9	29.5	36
37	17.6	18.3	18.9	19.6	20.2	20.9	21.5	22.1	22.8	23.4	24.1	24.7	25.4	26.0	26.7	27.3	28.0	28.6	29.3	30.0	37
38	17.9	18.5	19.2	19.8	20.5	21.1	21.8	22.4	23.1	23.8	24.4	25.1	25.7	26.4	27.1	27.7	28.4	29.1	29.7	30.4	38
39	18.1	18.8	19.5	20.1	20.8	21.4	22.1	22.8	23.4	24.1	24.8	25.4	26.1	26.8	27.5	28.1	28.8	29.5	30.2	30.9	39
40	18.4	19.1	19.8	20.4	21.1	21.8	22.4	23.1	23.8	24.4	25.2	25.8	26.5	27.2	27.9	28.6	29.3	30.0	30.7	31.4	40
41	18.7	19.4	20.1	20.8	21.4	22.1	22.8	23.5	24.2	24.9	25.6	26.3	27.0	27.7	28.4	29.1	29.8	30.5	31.2	31.9	41
42	19.0	19.7	20.4	21.1	21.8	22.5	23.2	23.9	24.6	25.3	26.0	26.7	27.4	28.1	28.8	29.6	30.3	31.0	31.7	32.5	42
43	19.3	20.0	20.7	21.4	22.1	22.9	23.6	24.3	25.0	25.7	26.4	27.2	27.9	28.6	29.3	30.1	30.8	31.6	32.3	33.0	43
44	19.7	20.4	21.1	21.8	22.5	23.3	24.0	24.7	25.4	26.2	26.9	27.7	28.4	29.1	29.9	30.6	31.4	32.1	32.9	33.7	44
45	20.0	20.7	21.5	22.2	23.0	23.7	24.4	25.2	25.9	26.7	27.4	28.2	28.9	29.7	30.5	31.2	32.0	32.8	33.6	34.3	45
46	20.4	21.1	21.9	22.6	23.4	24.1	24.9	25.7	26.4	27.2	28.0	28.7	29.5	30.3	31.1	31.9	32.6	33.4	34.2	35.0	46
47	20.8	21.5	22.3	23.1	23.8	24.5	25.4	26.2	27.0	27.7	28.5	29.3	30.1	30.9	31.7	32.5	33.3	34.1	35.0	35.8	47
48	21.2	22.0	22.8	23.6	24.3	25.1	25.9	26.7	27.5	28.2	29.1	29.9	30.7	31.6	32.4	33.2	34.1	34.9	35.7	36.6	48
49	21.6	22.4	23.2	24.1	24.9	25.7	26.5	27.3	28.1	28.9	29.8	30.6	31.4	32.3	33.1	34.0	34.8	35.7	36.6	37.4	49
50	22.1	22.9	23.8	24.6	25.4	26.2	27.1	27.9	28.7	29.6	30.4	31.3	32.2	33.0	33.9	34.8	35.7	36.5	37.4	38.3	50
51	22.6	23.5	24.3	25.1	26.0	26.8	27.7	28.6	29.4	30.3	31.2	32.0	32.9	33.8	34.7	35.6	36.5	37.5	38.4	39.3	51
52	23.1	24.0	24.9	25.7	26.6	27.5	28.4	29.2	30.1	31.0	31.9	32.8	33.8	34.7	35.6	36.5	37.5	38.4	39.4	40.4	52
53	23.7	24.6	25.5	26.4	27.3	28.2	29.1	30.0	30.9	31.8	32.8	33.7	34.6	35.6	36.6	37.5	38.5	39.5	40.5	41.5	53
54	24.3	25.2	26.1	27.1	28.0	28.9	29.8	30.8	31.7	32.7	33.6	34.6	35.6	36.6	37.6	38.6	39.6	40.6	41.7	42.7	54
55	25.0	25.9	26.8	27.8	28.7	29.7	30.7	31.6	32.6	33.6	34.6	35.6	36.6	37.6	38.7	39.7	40.8	41.9	42.9	44.1	55
56	25.6	26.6	27.6	28.6	29.5	30.5	31.5	32.6	33.6	34.6	35.6	36.7	37.7	38.8	39.9	41.0	42.1	43.2	44.3	45.5	56
57	26.4	27.4	28.4	29.4	30.4	31.4	32.5	33.5	34.6	35.6	36.7	37.8	38.9	40.0	41.2	42.3	43.5	44.6	45.8	47.1	57
58	27.2	28.2	29.2	30.3	31.4	32.4	33.5	34.6	35.7	36.8	37.9	39.1	40.2	41.4	42.6	43.8	45.0	46.2	47.5	48.8	58
59	28.1	29.1	30.2	31.3	32.4	33.5	34.6	35.7	36.9	38.0	39.2	40.4	41.6	42.8	44.1	45.4	46.7	48.0	49.4	50.7	59
60	28.9	30.1	31.2	32.3	33.5	34.6	35.8	37.0	38.2	39.4	40.6	41.9	43.2	44.5	45.8	47.1	48.5	49.9	51.4	52.9	60
61	29.9	31.1	32.3	33.5	34.6	35.9	37.1	38.3	39.6	40.9	42.2	43.5	44.9	46.3	47.7	49.1	50.6	52.1	53.7	55.3	61
62	30.1	32.2	33.5	34.7	36.0	37.2	38.5	39.8	41.2	42.5	43.9	45.3	46.8	48.3	49.8	51.3	52.9	54.6	56.3	58.2	62
63	32.2	33.5	34.8	36.1	37.4	38.7	40.1	41.5	42.9	44.3	45.8	47.3	48.9	50.5	52.1	53.8	55.6	57.5	59.4	61.4	63
64	33.5	34.8	36.2	37.6	39.0	40.4	41.8	43.3	44.8	46.4	48.0	49.6	51.3	53.0	54.8	56.7	58.7	60.8	63.0	65.5	64
65	34.9	36.3	37.8	39.2	40.7	42.2	43.8	45.4	47.0	48.7	50.4	52.2	54.0	56.0	58.0	60.1	62.4	64.9	67.6	70.7	65

T. 19) Reducção da hora da culminação da lua, por effeito da longitude

Long. (graus)	Subtrahe-se nas long.s E. — Differença entre duas culminações superiores e consecutivas — Somma-se nas long.s W. 48m	42m	44m	46m	48m	50m	52m	54m	56m	58m	60m	62m	64m	66m	Long. (tempo)
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	h m
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
10	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.7	1.8	1.8	0.40
20	2.2	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.6	3.7	1.20
30	3.3	3.5	3.7	3.8	4.0	4.2	4.3	4.5	4.7	4.8	5.0	5.2	5.3	5.5	2.00
40	4.4	4.7	4.9	5.1	5.3	5.6	5.8	6.0	6.2	6.4	6.7	6.9	7.1	7.3	2.40
50	5.6	5.8	6.1	6.4	6.7	6.9	7.2	7.5	7.8	8.1	8.3	8.6	8.9	9.2	3.20
60	6.7	7.0	7.3	7.7	8.0	8.3	8.7	9.0	9.3	9.7	10.0	10.3	10.7	11.0	4.00
70	7.8	8.2	8.6	8.9	9.3	9.7	10.1	10.5	10.9	11.3	11.7	12.1	12.4	12.8	4.40
80	8.9	9.3	9.8	10.2	10.7	11.1	11.6	12.0	12.4	12.9	13.3	13.8	14.2	14.7	5.20
90	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	6.00
100	11.1	11.7	12.2	12.8	13.3	13.9	14.4	15.0	15.6	16.1	16.6	17.2	17.8	18.3	6.40
110	12.2	12.8	13.4	14.1	14.7	15.3	15.9	16.5	17.1	17.7	18.3	18.9	19.6	20.2	7.20
120	13.3	14.0	14.7	15.3	16.0	16.7	17.3	18.0	18.7	19.3	20.0	20.7	21.3	22.0	8.00
130	14.4	15.2	15.9	16.6	17.3	18.1	18.8	19.5	20.2	20.9	21.7	22.4	23.1	23.8	8.40
140	15.6	16.3	17.1	17.9	18.7	19.4	20.2	21.0	21.8	22.6	23.3	24.1	24.9	25.7	9.20
150	16.7	17.5	18.3	19.2	20.0	20.8	21.7	22.5	23.3	24.2	25.0	25.8	26.7	27.5	10.00
160	17.8	18.7	19.6	20.4	21.3	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.4	29.3	10.40
170	18.9	19.8	20.8	21.7	22.7	23.6	24.6	25.5	26.4	27.4	28.3	29.3	30.2	31.2	11.20
180	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0	32.0	33.0	12.00

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T. 20) 2.ª Correcção da Distancia apparente da Lua

Corr. de Alt. ou Dist.	Distancia apparente																		
	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°
′	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
5	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
8	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
10	5	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1
11	6	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1
12	7	6	5	4	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1
13	8	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2	2	1
14	10	8	7	6	5	5	4	4	4	3	3	3	3	2	2	2	2	2	2
15	11	9	8	7	6	5	5	4	4	4	3	3	3	3	3	2	2	2	2
16	13	11	9	8	7	6	6	5	5	4	4	4	3	3	3	3	2	2	2
17	14	12	10	9	8	7	6	6	5	5	4	4	4	3	3	3	3	3	2
18	16	13	11	10	9	8	7	6	6	5	5	5	4	4	4	3	3	3	3
19	18	15	13	11	10	9	8	7	6	6	5	5	5	4	4	4	3	3	3
20	20	16	14	12	11	10	9	8	7	7	6	6	5	5	4	4	4	4	3
21	22	18	15	13	12	11	10	9	8	7	7	6	6	5	5	5	4	4	4
22	24	20	17	15	13	12	10	9	9	8	7	7	6	6	5	5	5	4	4
23	26	22	19	16	14	13	11	10	9	9	8	7	7	6	6	6	5	5	4
24	28	24	20	18	15	14	12	11	10	9	9	8	7	7	6	6	6	5	5
25	31	26	22	19	17	15	13	12	11	10	9	9	8	8	7	6	6	6	5
26	33	28	24	21	18	16	15	13	12	11	10	9	9	8	8	7	7	6	6
27	36	30	26	22	20	17	16	14	13	12	11	10	9	9	8	8	7	7	6
28	39	32	27	24	21	19	17	15	14	13	12	11	10	9	9	8	8	7	7
29	42	35	29	26	23	20	18	16	15	14	13	12	11	10	9	9	8	8	7
30	45	37	31	27	24	22	19	18	16	15	14	13	12	11	10	9	9	8	8
31	48	39	34	29	26	23	21	19	17	16	15	13	12	12	11	10	9	9	8
32	51	42	36	31	27	25	22	20	18	17	15	14	13	12	11	11	10	9	9
33	54	45	38	33	29	26	24	21	19	18	16	15	14	13	12	11	11	10	9
34	57	47	40	35	31	28	25	23	21	19	17	16	15	14	13	12	11	10	10
35	61	50	43	37	33	29	26	24	22	20	19	17	16	15	14	13	12	11	10
36	64	53	45	39	35	31	28	25	23	21	20	18	17	16	14	13	13	12	11
37	68	56	48	42	37	33	30	27	24	22	21	19	18	16	15	14	13	12	12
38	71	59	51	44	39	35	31	28	26	24	22	20	19	17	16	15	14	13	12
39	75	62	53	46	41	36	33	30	27	25	23	21	20	18	17	16	15	14	13
40	79	66	56	49	43	38	35	31	29	26	24	22	21	19	18	17	16	14	13
41	83	69	59	51	45	40	36	33	30	28	25	23	22	20	19	17	16	15	14
42	87	72	62	54	47	42	38	35	32	29	27	25	23	21	20	18	17	16	15
43	91	76	65	56	50	44	40	36	33	30	28	26	24	22	21	19	18	17	16
44	96	79	68	59	52	46	42	38	35	32	29	27	25	23	22	20	19	17	16
45	100	83	71	62	54	49	44	40	36	33	31	28	26	24	23	21	20	18	17
46	105	87	74	64	57	51	46	41	38	35	32	30	27	25	24	22	21	19	18
47	109	91	77	67	59	53	48	43	40	36	33	31	29	27	25	23	21	20	19
48	114	94	81	70	62	55	50	45	41	38	35	32	30	28	26	24	22	21	19
49	119	98	84	73	64	58	52	47	43	39	36	34	31	29	27	25	23	22	20
50	124	103	87	76	67	60	54	49	45	41	38	35	32	30	28	26	24	23	21
51	128	107	91	79	70	62	56	51	47	43	39	36	34	31	29	27	25	24	22
52	134	111	95	82	73	65	58	53	48	44	41	38	35	32	30	28	26	24	23
53	139	115	98	85	75	67	61	55	50	46	42	39	36	34	31	29	27	25	24
54	144	120	102	89	78	70	63	57	52	48	44	41	38	35	33	30	28	26	25
55	149	124	106	92	81	72	65	59	54	50	46	42	39	36	34	31	29	27	25
56	155	129	110	95	84	75	68	61	56	51	47	44	41	38	35	33	30	28	26
57	160	133	114	99	87	78	70	64	58	53	49	45	42	39	36	34	31	29	27
58	166	138	118	102	90	81	73	66	60	55	51	47	44	40	38	35	33	30	28
59	172	143	122	106	93	83	75	68	62	57	53	49	45	42	39	36	34	31	29
60	178	148	126	109	97	86	78	71	64	59	54	50	47	43	40	37	35	33	30
61	184	152	130	113	100	89	80	73	67	61	56	52	48	45	42	39	36	34	31
62	190	158	134	117	103	92	83	75	69	63	58	54	50	46	43	40	37	35	32
	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°

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T. 20) 2.ª Correcção da Distancia apparente da Lua

Corr. de Alt. ou Dist.	Distancia apparente																		
	48°	50°	52°	54°	56°	58°	60°	65°	70°	75°	80	85°	90°	95°	100°	105°	110°	115°	120°
′	″	″	″	″	″	″	′	″	′	″	″	″	′	″	″	″	″	″	″
5	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20
8	1	0	0	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20
10	1	1	1	1	1	1	1	0	0	0	0	0	0	20	20	20	20	20	19
11	1	1	1	1	1	1	1	0	0	0	0	0	0	20	20	20	20	20	19
12	1	1	1	1	1	1	1	1	0	0	0	0	0	20	20	20	20	19	19
13	1	1	1	1	1	1	1	1	1	0	0	0	0	20	20	20	19	19	19
14	2	1	1	1	1	1	1	1	1	0	0	0	0	20	20	20	19	19	19
15	2	2	2	1	1	1	1	1	1	1	0	0	0	20	20	19	19	19	19
16	2	2	2	2	2	1	1	1	1	1	0	0	0	20	20	19	19	19	19
17	2	2	2	2	2	2	1	1	1	1	0	0	0	20	20	19	19	19	19
18	3	2	2	2	2	2	2	1	1	1	0	0	0	20	20	19	19	19	18
19	3	3	2	2	2	2	2	1	1	1	1	0	0	20	19	19	19	19	18
20	3	3	3	3	2	2	2	2	1	1	1	0	0	20	19	19	19	18	18
21	3	3	3	3	3	2	2	2	1	1	1	0	0	20	19	19	19	18	18
22	4	4	3	3	3	3	2	2	2	1	1	0	0	20	19	19	18	18	18
23	4	4	4	3	3	3	3	2	2	1	1	0	0	20	19	19	18	18	17
24	5	4	4	4	3	3	3	2	2	1	1	0	0	20	19	19	18	18	17
25	5	5	4	4	4	3	3	3	2	1	1	0	0	20	19	19	18	17	17
26	5	5	5	4	4	4	3	3	2	2	1	1	0	19	19	18	18	17	17
27	6	5	5	5	4	4	4	3	2	2	1	1	0	19	19	18	18	17	16
28	6	6	5	5	5	4	4	3	2	2	1	1	0	19	19	18	18	17	16
29	7	6	6	5	5	5	4	3	3	2	1	1	0	19	19	18	17	17	16
30	7	7	6	6	5	5	5	4	3	2	1	1	0	19	19	18	17	16	15
31	8	7	7	6	6	5	5	4	3	2	1	1	0	19	19	18	17	16	15
32	8	7	7	6	6	6	5	4	3	2	2	1	0	19	18	18	17	16	15
33	9	8	7	7	6	6	5	4	3	3	2	1	0	19	18	17	17	16	15
34	9	8	8	7	7	6	6	5	4	3	2	1	0	19	18	17	16	15	14
35	10	9	8	8	7	7	6	5	4	3	2	1	0	19	18	17	16	15	14
36	10	9	9	8	8	7	7	5	4	3	2	1	0	19	18	17	16	15	13
37	11	10	9	9	8	7	7	6	4	3	2	1	0	19	18	17	16	14	13
38	11	11	10	9	8	8	7	6	5	3	2	1	0	19	18	17	15	14	13
39	12	11	10	10	9	8	8	6	5	4	2	1	0	19	18	16	15	14	12
40	13	12	11	10	9	9	8	7	5	4	2	1	0	19	18	16	15	13	12
41	13	12	11	11	10	9	8	7	5	4	3	1	0	19	17	16	15	13	12
42	14	13	12	11	10	10	9	7	6	4	3	1	0	19	17	16	14	13	11
43	15	14	13	12	11	10	9	8	6	4	3	1	0	19	17	16	14	12	11
44	15	14	13	12	11	11	10	8	6	5	3	1	0	19	17	15	14	12	10
45	16	15	14	13	12	11	10	8	6	5	3	2	0	18	17	15	14	12	10
46	17	15	14	13	12	12	11	9	7	5	3	2	0	18	17	15	13	11	9
47	17	16	15	14	13	12	11	9	7	5	3	2	0	18	17	15	13	11	9
48	18	17	16	15	14	13	12	9	7	5	4	2	0	18	16	15	13	11	8
49	19	18	16	15	14	13	12	10	8	6	4	2	0	18	16	14	12	10	8
50	20	18	17	16	15	14	13	10	8	6	4	2	0	18	16	14	12	10	7
51	20	19	18	16	15	14	13	11	8	6	4	2	0	18	16	14	12	9	7
52	21	20	18	17	16	15	14	11	9	6	4	2	0	18	16	14	11	9	6
53	22	21	19	18	17	15	14	11	9	7	4	2	0	18	16	13	11	9	6
54	23	21	20	18	17	16	15	12	9	7	4	2	0	18	16	13	11	8	5
55	24	22	21	19	18	16	15	12	10	7	5	2	0	18	15	13	10	8	5
56	25	23	21	20	18	17	16	13	10	7	5	2	0	18	15	13	10	7	4
57	26	24	22	21	19	18	16	13	10	8	5	2	0	18	15	12	10	7	4
58	26	25	23	21	20	18	17	14	11	8	5	3	0	17	15	12	9	6	3
59	27	25	24	22	20	19	18	14	11	8	5	3	0	17	15	12	9	6	2
60	28	26	25	23	21	20	18	15	11	8	6	3	0	17	14	12	9	5	2
61	29	27	25	24	22	20	19	15	12	9	6	3	0	17	14	11	8	5	1
62	30	28	26	24	23	21	19	16	12	9	6	3	0	17	14	11	8	4	1
	48°	50°	52°	54°	56°	58°	60°	65°	70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°

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Navegação orthodromica

P = Differença de longitudes entre a do ponto de intersecção do arco de circuito maximo com o equador, e a de qualquer ponto do arco.
θ = Angulo de intersecção do mesmo arco com o equador.

T. 21)

θ	P															θ
	3°	6°	9°	12°	15°	18°	21°	24°	27°	30°	33°	36°	39°	42°	45°	
°	°	° ′	° ′	° ′	°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	°
2	0 06	0 13	0 19	0 25	0 31	0 37	0 43	0 49	0 54	1 00	1 05	1 11	1 16	1 20	1 25	2
3	0 09	0 19	0 28	0 37	0 47	0 56	1 05	1 13	1 22	1 30	1 38	1 46	1 53	2 00	2 07	3
4	0 13	0 25	0 38	0 50	1 02	1 14	1 26	1 38	1 49	2 00	2 11	2 21	2 31	2 40	2 50	4
5	0 16	0 31	0 47	1 02	1 18	1 33	1 48	2 02	2 16	2 30	2 44	2 57	3 09	3 21	3 32	5
6	0 19	0 38	0 57	1 15	1 34	1 52	2 09	2 27	2 44	3 00	3 17	3 32	3 47	4 01	4 15	6
7	0 22	0 44	1 06	1 28	1 49	2 10	2 31	2 52	3 11	3 31	3 50	4 08	4 25	4 41	4 58	7
8	0 25	0 50	1 16	1 41	2 05	2 29	2 53	3 16	3 39	4 01	4 23	4 43	5 03	5 22	5 41	8
9	0 29	0 57	1 25	1 53	2 21	2 48	3 15	3 41	4 07	4 32	4 56	5 19	5 41	6 03	6 23	9
10	0 32	1 03	1 35	2 06	2 37	3 07	3 37	4 06	4 35	5 02	5 29	5 55	6 20	6 44	7 06	10
11	0 35	1 10	1 45	2 19	2 53	3 26	3 59	4 31	5 03	5 33	6 03	6 31	6 58	7 25	7 49	11
12	0 38	1 16	1 54	2 32	3 09	3 46	4 21	4 57	5 31	6 04	6 36	7 07	7 37	8 06	8 33	12
13	0 42	1 23	2 04	2 45	3 25	4 05	4 43	5 22	5 59	6 35	7 10	7 44	8 16	8 47	9 16	13
14	0 45	1 30	2 14	2 58	3 42	4 24	5 06	5 47	6 27	7 06	7 44	8 20	8 55	9 28	10 00	14
15	0 48	1 36	2 24	3 11	3 59	4 44	5 29	6 13	6 56	7 38	8 18	8 57	9 34	10 10	10 44	15
16	0 52	1 43	2 34	3 25	4 15	5 04	5 52	6 39	7 25	8 10	8 53	9 34	10 14	10 52	11 28	16
17	0 55	1 50	2 44	3 38	4 31	5 24	6 15	7 05	7 54	8 41	9 27	10 11	10 53	11 34	12 12	17
18	0 59	1 57	2 55	3 52	4 49	5 44	6 39	7 32	8 24	9 14	10 02	10 49	11 33	12 16	12 56	18
19	1 02	2 04	3 06	4 06	5 06	6 04	7 02	7 58	8 53	9 46	10 37	11 27	12 14	12 58	13 41	19
20	1 05	2 11	3 16	4 20	5 23	6 25	7 26	8 25	9 23	10 19	11 13	12 05	12 54	13 41	14 26	20
21	1 09	2 18	3 26	4 34	5 41	6 46	7 50	8 53	9 53	10 52	11 49	12 43	13 35	14 24	15 11	21
22	1 13	2 25	3 37	4 48	5 58	7 07	8 14	9 20	10 24	11 25	12 25	13 22	14 16	15 08	15 57	22
23	1 16	2 32	3 48	5 03	6 16	7 28	8 39	9 48	10 55	11 59	13 01	14 01	14 57	15 51	16 42	23
24	1 20	2 40	3 59	5 17	6 34	7 50	9 04	10 16	11 26	12 33	13 38	14 40	15 39	16 35	17 29	24
25	1 24	2 47	4 10	5 32	6 53	8 12	9 29	10 44	11 57	13 08	14 15	15 20	16 21	17 20	18 15	25
26	1 28	2 55	4 22	5 47	7 12	8 35	9 51	11 13	12 29	13 42	14 53	16 00	17 04	18 05	19 02	26
27	1 32	3 03	4 34	6 03	7 31	8 57	10 21	11 43	13 02	14 18	15 31	16 40	17 47	18 50	19 49	27
28	1 36	3 11	4 45	6 19	7 50	9 20	10 47	12 12	13 34	14 53	16 09	17 21	18 30	19 35	20 36	28
29	1 40	3 19	4 57	6 35	8 10	9 43	11 14	12 42	14 07	15 29	16 48	18 03	19 14	20 21	21 24	29
30	1 44	3 27	5 10	6 51	8 30	10 07	11 41	13 13	14 41	16 06	17 27	18 45	19 58	21 07	22 13	30
31	1 48	3 36	5 22	7 07	8 50	10 31	12 09	13 44	15 15	16 43	18 07	19 27	20 43	21 54	23 01	31
32	1 52	3 44	5 35	7 24	9 11	10 56	12 37	14 16	15 50	17 21	18 48	20 10	21 28	22 41	23 50	32
33	1 57	3 53	5 48	7 41	9 33	11 21	13 06	14 48	16 26	17 59	19 29	20 54	22 14	23 29	24 40	33
34	2 01	4 02	6 02	7 59	9 54	11 46	13 35	15 20	17 02	18 38	20 10	21 38	23 00	24 17	25 30	34
35	2 06	4 11	6 15	8 17	10 16	12 12	14 05	15 54	17 38	19 18	20 52	22 22	23 47	25 06	26 20	35
36	2 11	4 21	6 29	8 35	10 39	12 39	14 36	16 28	18 15	19 58	21 35	23 08	24 34	25 56	27 12	36
37	2 16	4 30	6 43	8 54	11 02	13 07	15 07	17 02	18 53	20 39	22 19	23 53	25 22	26 45	28 03	37
38	2 20	4 40	6 58	9 14	11 26	13 35	15 39	17 38	19 32	21 20	23 03	24 40	26 11	27 36	28 55	38
39	2 26	4 50	7 13	9 33	11 50	14 03	16 11	18 14	20 11	22 03	23 48	25 27	27 00	28 27	29 48	39
40	2 31	5 01	7 29	9 54	12 15	14 32	16 44	18 51	20 51	22 46	24 34	26 15	27 50	29 19	30 41	40
41	2 36	5 11	7 45	10 15	12 41	15 02	17 18	19 28	21 32	23 30	25 20	27 04	28 41	30 11	31 35	41
42	2 42	5 23	8 01	10 36	13 07	15 33	17 53	20 07	22 14	24 14	26 07	27 53	29 32	31 04	32 29	42
43	2 48	5 34	8 18	10 58	13 34	16 05	18 29	20 46	22 57	25 00	26 55	28 44	30 24	31 58	33 24	43
44	2 54	5 46	8 35	11 21	14 02	16 37	19 05	21 27	23 40	25 46	27 44	29 35	31 17	32 52	34 20	44
45	3 00	5 58	8 54	11 45	14 31	17 10	19 43	22 08	24 25	26 34	28 35	30 27	32 11	33 47	35 16	45

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Navegação orthodromica

P = Differença de longitudes entre a do ponto de intersecção do arco de circuito maximo com o equador, e a de qualquer ponto do arco.
θ = Angulo de intersecção do mesmo arco com o equador.

T. 21)

θ	P															θ
	48°	51°	54°	57°	60°	63°	66°	69°	72°	75°	78°	81°	84°	87°	90°	
°	° ′	° ′	° ′	° ′	° ′	° ′	°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	°
2	1 29	1 33	1 37	1 41	1 44	1 47	1 50	1 52	1 54	1 56	1 57	1 59	1 59	2 00	2 00	2
3	2 14	2 20	2 26	2 31	2 36	2 40	2 45	2 48	2 51	2 53	2 56	2 58	2 59	3 00	3 00	3
4	2 58	3 07	3 14	3 21	3 28	3 34	3 40	3 44	3 48	3 52	3 55	3 57	3 58	4 00	4 00	4
5	3 43	3 53	4 03	4 12	4 20	4 27	4 34	4 40	4 45	4 50	4 53	4 56	4 58	5 00	5 00	5
6	4 28	4 40	4 52	5 03	5 12	5 21	5 29	5 36	5 42	5 48	5 52	5 56	5 58	6 00	6 00	6
7	5 13	5 27	5 40	5 53	6 04	6 15	6 24	6 32	6 40	6 46	6 51	6 55	6 58	6 59	7 00	7
8	5 58	6 14	6 29	6 43	6 56	7 08	7 19	7 28	7 37	7 44	7 50	7 54	7 57	7 59	8 00	8
9	6 43	7 01	7 18	7 34	7 49	8 02	8 14	8 25	8 34	8 42	8 49	8 53	8 57	8 59	9 00	9
10	7 28	7 48	8 07	8 25	8 41	8 56	9 09	9 21	9 31	9 40	9 47	9 53	9 57	9 59	10 00	10
11	8 13	8 35	8 56	9 16	9 33	9 50	10 04	10 17	10 28	10 38	10 46	10 52	10 57	10 59	11 00	11
12	8 59	9 23	9 46	10 07	10 26	10 44	11 00	11 14	11 26	11 36	11 45	11 51	11 56	11 59	12 00	12
13	9 44	10 10	10 35	10 57	11 18	11 37	11 55	12 10	12 23	12 34	12 43	12 51	12 56	12 59	13 00	13
14	10 30	10 58	11 24	11 49	12 11	12 31	12 50	13 06	13 20	13 32	13 42	13 50	13 56	13 59	14 00	14
15	11 16	11 46	12 14	12 40	13 04	12 26	13 45	14 03	14 18	14 31	14 41	14 49	14 55	14 59	15 00	15
16	12 02	12 34	13 04	13 31	13 57	14 20	14 41	14 59	15 15	15 29	15 40	15 49	15 55	15 59	16 00	16
17	12 48	13 22	13 54	14 23	14 50	15 14	15 36	15 56	16 13	16 27	16 39	16 48	16 55	16 59	17 00	17
18	13 35	14 10	14 44	15 15	15 43	16 09	16 32	16 53	17 10	17 26	17 38	17 48	17 55	17 59	18 00	18
19	14 21	14 59	15 34	16 07	16 36	17 03	17 28	17 49	18 08	18 24	18 37	18 47	18 54	18 59	19 00	19
20	15 08	15 48	16 25	16 59	17 30	17 58	18 23	18 46	19 06	19 22	19 36	19 46	19 54	19 59	20 00	20
21	15 35	16 37	17 15	17 51	18 23	18 53	19 19	19 43	20 03	20 21	20 35	20 46	20 54	20 59	21 00	21
22	16 43	17 26	18 06	18 43	19 17	19 48	20 15	20 40	21 01	21 19	21 34	21 45	21 53	21 58	22 00	22
23	17 31	18 15	18 57	19 36	20 11	20 43	21 12	21 37	21 59	22 18	22 33	22 45	22 53	22 58	23 00	23
24	18 19	19 05	19 49	20 29	21 05	21 38	22 08	22 34	22 57	23 16	23 32	23 44	23 53	23 58	24 00	24
25	19 07	19 55	20 40	21 22	21 59	22 34	23 04	23 31	23 55	24 15	24 31	24 44	24 53	24 58	25 00	25
26	19 55	20 46	21 32	22 15	22 54	23 29	24 01	24 29	24 53	25 13	25 30	25 43	25 53	25 58	26 00	26
27	20 44	21 36	22 24	23 08	23 49	24 25	24 58	25 26	25 51	26 13	26 30	26 43	26 52	26 58	27 00	27
28	21 34	22 27	23 17	24 02	24 44	25 21	25 54	26 24	26 50	27 11	27 29	27 42	27 52	27 58	28 00	28
29	22 23	23 18	24 09	24 56	25 39	26 17	26 51	27 22	27 48	28 10	28 28	28 42	28 52	28 58	29 00	29
30	23 13	24 10	25 02	25 50	26 34	27 13	27 49	28 20	28 46	29 09	29 27	29 42	29 52	29 58	30 00	30
31	24 04	25 02	25 55	26 45	27 29	28 10	28 46	29 17	29 45	30 08	30 27	30 41	30 52	30 58	31 00	31
32	24 55	25 54	26 49	27 39	28 25	29 06	29 43	30 15	30 43	31 07	31 26	31 41	31 52	31 58	32 00	32
33	25 46	26 47	27 43	28 34	29 21	30 03	30 41	31 14	31 42	32 06	32 26	32 41	32 51	32 58	33 00	33
34	26 37	27 40	28 37	29 30	30 17	31 00	31 38	32 12	32 41	33 05	33 25	33 40	33 51	33 58	34 00	34
35	27 29	28 33	29 32	30 25	31 14	31 57	32 36	33 10	33 40	34 04	34 24	34 40	34 51	34 58	35 00	35
36	28 22	29 27	30 27	31 21	32 11	32 55	33 34	34 09	34 39	35 04	35 24	35 40	35 51	35 58	36 00	36
37	29 15	30 21	31 22	32 17	33 08	33 53	34 32	35 08	35 38	36 03	36 24	36 39	36 51	36 58	37 00	37
38	30 08	31 16	32 18	33 14	34 05	34 51	35 31	36 07	36 37	37 03	37 23	37 39	37 51	37 58	38 00	38
39	31 02	32 11	33 14	34 11	35 03	35 49	36 30	37 05	37 36	38 02	38 23	38 39	38 51	38 58	39 00	39
40	31 57	33 06	34 10	35 08	36 00	36 47	37 28	38 05	38 36	39 01	39 23	39 39	39 51	39 58	40 00	40
41	32 52	34 03	35 07	36 05	36 58	37 45	38 27	39 04	39 35	40 01	40 23	40 39	40 51	40 58	41 00	41
42	33 47	34 59	36 04	37 03	37 57	38 44	39 26	40 03	40 35	41 01	41 22	41 39	41 51	41 58	42 00	42
43	34 43	35 56	37 02	38 01	38 55	39 43	40 26	41 02	41 34	42 01	42 22	42 39	42 51	42 58	43 00	43
44	35 40	36 53	38 00	39 00	39 55	40 42	41 26	42 02	42 34	43 01	43 22	43 39	43 51	43 58	44 00	44
45	36 37	37 51	38 58	39 59	40 54	41 42	42 25	43 02	43 34	44 01	44 22	44 39	44 51	44 58	45 00	45

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Navegação orthodromica

P = Differença de longitudes, entre a do ponto de intersecção do arco de circulo maximo com o equador, e a de qualquer ponto do arco.
θ = Angulo de intersecção do mesmo arco com o equador.

T. 21)

θ	P																								θ
	3°		6°		9°		12°		15°		18°		21°		24°		27°		30°		33°		36°		39°		42°		45°		
°	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°
45	3	00	5	58	8	54	11	45	14	31	17	10	19	43	22	08	24	25	26	34	28	35	30	27	32	11	33	47	35	16	45
46	3	06	6	11	9	12	12	09	15	00	17	45	20	22	22	50	25	11	27	23	29	25	31	20	33	06	34	43	36	13	46
47	3	13	6	24	9	31	12	34	15	31	18	20	21	01	23	34	25	58	28	12	30	17	32	14	34	01	35	40	37	10	47
48	3	20	6	37	9	51	13	00	16	02	18	57	21	42	24	19	26	46	29	03	31	10	33	08	34	57	36	37	38	09	48
49	3	27	6	51	10	12	13	27	16	35	19	34	22	24	25	05	27	35	29	54	32	04	34	04	35	54	37	35	39	08	49
50	3	34	7	06	10	34	13	55	17	09	20	13	23	08	25	52	28	25	30	48	32	59	35	01	36	52	38	34	40	07	50
51	3	42	7	21	10	56	14	24	17	44	20	53	23	52	26	40	29	17	31	42	33	56	35	59	37	51	39	34	41	08	51
52	3	50	7	37	11	19	14	54	18	20	21	35	24	38	27	30	30	09	32	37	34	53	36	57	38	51	40	35	42	09	52
53	3	58	7	54	11	44	15	26	18	57	22	18	25	26	28	22	31	04	33	34	35	52	37	57	39	52	41	36	43	11	53
54	4	07	8	11	12	09	15	58	19	37	23	03	26	15	29	15	32	00	34	32	36	51	38	58	40	54	42	39	44	13	54
55	4	16	8	29	12	36	16	32	20	17	23	49	27	06	30	09	32	57	35	32	37	53	40	01	41	57	43	42	45	17	55
56	4	26	8	48	13	03	17	08	20	59	24	37	27	59	31	05	33	57	36	33	38	55	41	04	43	01	44	46	46	21	56
57	4	36	9	09	13	33	17	45	21	44	25	27	28	54	32	04	34	58	37	36	39	59	42	09	44	06	45	52	47	26	57
58	4	47	9	30	14	03	18	24	22	29	26	19	29	50	33	04	36	00	38	40	41	04	43	15	45	12	46	57	48	32	58
59	4	59	9	52	14	36	19	05	23	18	27	13	30	49	34	06	37	04	39	46	42	11	44	22	46	12	48	04	49	39	59
60	5	11	10	16	15	10	19	48	24	09	28	10	31	50	35	10	38	11	40	54	43	20	45	31	47	28	49	13	50	46	60
61	5	23	10	41	15	46	20	34	25	02	29	08	32	53	36	16	39	19	42	03	44	30	46	41	48	38	50	21	51	54	61
62	5	37	11	07	16	24	21	22	25	57	30	10	33	59	37	25	40	30	43	14	45	41	47	52	49	48	51	32	53	04	62
63	5	52	11	36	17	04	22	12	26	56	31	14	35	07	38	36	41	42	44	27	46	55	49	05	51	00	52	43	54	14	63
64	6	07	12	06	17	47	23	05	27	57	32	21	36	18	39	49	42	57	45	43	48	09	50	19	52	13	53	55	55	24	64
65	6	24	12	38	18	33	24	02	29	02	33	32	37	33	41	06	44	14	47	00	49	26	51	34	53	28	55	08	56	36	65
66	6	42	13	13	19	22	25	02	30	10	34	46	38	50	42	25	45	34	48	19	50	44	52	52	54	43	56	22	57	48	66
67	7	02	13	50	20	14	26	06	31	22	36	03	40	10	43	47	46	55	49	40	52	04	54	10	56	00	57	36	59	01	67
68	7	23	14	30	21	10	27	14	32	39	37	25	41	34	45	12	48	20	51	04	53	26	55	30	57	18	58	53	60	16	68
69	7	46	15	14	22	10	28	27	33	59	38	50	43	02	46	39	49	47	52	29	54	50	56	51	58	37	60	10	61	30	69
70	8	11	16	01	23	16	29	44	35	25	40	20	44	33	48	11	51	17	53	57	56	15	58	14	59	57	61	27	62	46	70
71	8	38	16	53	24	26	31	08	36	56	41	54	46	09	49	45	52	49	55	27	57	42	59	38	61	19	62	46	64	02	71
72	9	09	17	50	25	43	32	37	38	32	43	34	47	48	51	23	54	25	56	59	59	11	61	04	62	42	64	06	65	19	72
73	9	43	18	53	27	06	34	13	40	15	45	19	49	32	53	04	56	03	58	34	60	42	62	31	64	05	65	27	66	37	73
74	10	21	20	02	28	37	35	57	42	04	47	09	51	20	54	49	57	43	60	10	62	14	64	00	65	30	66	48	67	56	74
75	11	03	21	20	30	17	37	48	44	00	49	04	53	13	56	38	59	27	61	49	63	48	65	30	66	56	68	11	69	15	75
76	11	50	22	45	32	06	39	50	46	04	51	06	55	11	58	30	61	14	63	30	65	24	67	01	68	23	69	34	70	35	76
77	12	46	24	22	34	04	42	01	48	16	53	14	57	13	60	25	63	06	65	13	67	02	68	33	69	51	70	58	71	55	77
78	13	50	26	11	36	21	44	22	50	36	55	29	59	20	62	25	64	55	66	58	68	41	70	07	71	20	72	23	73	16	78
79	15	04	28	16	38	50	46	56	53	05	57	50	61	32	64	28	66	49	68	45	70	22	71	42	72	50	73	48	74	38	79
80	16	32	30	40	41	35	49	42	55	44	60	18	63	48	66	34	68	46	70	35	72	04	73	18	74	21	75	14	76	00	80
81	18	17	33	25	44	39	52	42	58	32	62	52	66	09	68	43	70	46	72	27	73	47	74	55	75	52	76	41	77	22	81
82	20	25	36	38	48	04	55	57	61	30	65	33	68	35	70	56	72	48	74	18	75	32	76	33	77	25	78	08	78	45	82
83	23	05	40	25	51	52	59	26	64	37	68	20	71	05	73	12	74	52	76	12	77	18	78	12	78	58	79	36	80	09	83
84	26	29	44	51	56	06	63	11	67	54	71	13	73	39	75	31	76	58	78	08	79	05	79	52	80	31	81	04	81	33	84
85	30	53	50	04	60	47	67	11	71	19	74	11	76	17	77	52	79	06	80	05	80	53	81	32	82	05	82	33	82	57	85
86	36	49	56	13	65	55	71	25	74	53	77	15	78	58	80	15	81	15	82	02	82	41	83	13	83	40	84	02	84	21	86
87	44	58	63	22	71	29	75	51	78	33	80	22	81	41	82	40	83	25	84	01	84	30	84	54	85	14	85	31	85	46	87
88	56	17	71	31	77	25	80	28	82	19	83	33	84	26	85	06	85	36	86	00	86	20	86	36	86	49	87	01	87	10	88
89	71	33	80	31	83	38	85	12	86	08	86	46	87	13	87	33	87	48	88	00	88	10	88	18	88	25	88	30	88	35	89
90	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90

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Navegação orthodromica

P = Differença de longitudes entre a do ponto de intersecção do arco de circuito maximo com o equador, e a de qualquer ponto do arco.
θ = Angulo de intersecção do mesmo arco com o equador.

T. 21)

θ	P																								θ
	48°		51°		54°		57°		60°		63°		66°		69°		72°		75°		78°		81°		84°		87°		90°		
°	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°
45	36	37	37	51	38	58	39	59	40	54	41	42	42	25	43	02	43	34	44	01	44	22	44	39	44	51	44	58	45	00	45
46	37	35	38	50	39	58	40	58	41	53	42	42	43	25	44	02	44	34	45	01	45	22	45	39	45	51	45	58	46	00	46
47	38	33	39	48	40	57	41	58	42	53	43	42	44	25	45	02	45	34	46	01	46	22	46	39	46	51	46	58	47	00	47
48	39	32	40	48	41	56	42	58	43	53	44	42	45	25	46	02	46	34	47	01	47	22	47	39	47	51	47	58	48	00	48
49	40	32	41	48	42	56	43	58	44	54	45	42	46	25	47	03	47	35	48	01	48	22	48	39	48	51	48	58	49	00	49
50	41	32	42	48	43	57	44	59	45	54	46	43	47	26	48	03	48	35	49	01	49	23	49	39	49	51	49	58	50	00	50
51	42	33	43	49	44	58	46	00	46	55	47	44	48	27	49	04	49	35	50	02	50	23	50	39	50	51	50	58	51	00	51
52	43	34	44	51	46	00	47	02	47	57	48	45	49	28	50	04	50	36	51	02	51	23	51	39	51	51	51	58	52	00	52
53	44	36	45	53	47	02	48	04	48	58	49	46	50	29	51	05	51	37	52	02	52	23	52	39	52	51	52	58	53	00	53
54	45	39	46	56	48	05	49	06	50	00	50	48	51	30	52	07	52	37	53	03	53	24	53	40	53	51	53	58	54	00	54
55	46	42	47	59	49	08	50	09	51	03	51	50	52	32	53	08	53	38	54	04	54	24	54	40	54	51	54	58	55	00	55
56	47	46	49	03	50	11	51	12	52	05	52	52	53	33	54	09	54	39	55	05	55	25	55	40	55	51	55	58	56	00	56
57	48	51	50	07	51	15	52	15	53	08	53	55	54	35	55	11	55	41	56	05	56	25	56	41	56	51	56	58	57	00	57
58	49	57	51	12	52	19	53	19	54	11	54	57	55	38	56	12	56	42	57	06	57	26	57	41	57	51	57	58	58	00	58
59	51	03	52	17	53	24	54	23	55	15	56	00	56	40	57	14	57	43	58	07	58	26	58	41	58	52	58	58	59	00	59
60	52	09	53	24	54	29	55	27	56	19	57	04	57	43	58	16	58	44	59	08	59	27	59	42	59	52	59	58	60	00	60
61	53	17	54	30	55	35	56	32	57	23	58	07	58	45	59	18	59	46	60	09	60	28	60	42	60	52	60	58	61	00	61
62	54	25	55	37	56	41	57	38	58	27	59	10	59	48	60	20	60	47	61	10	61	28	61	42	61	52	61	58	62	00	62
63	55	34	56	45	57	48	58	43	59	32	60	14	60	51	61	23	61	49	62	11	62	29	62	43	62	52	62	58	63	00	63
64	56	43	57	53	58	55	59	49	60	37	61	18	61	54	62	25	62	51	63	13	63	30	63	43	63	52	63	58	64	00	64
65	57	53	59	02	60	03	60	55	61	42	62	22	62	57	63	28	63	53	64	14	64	31	64	44	64	53	64	58	65	00	65
66	59	04	60	12	61	11	62	02	62	48	63	27	64	01	64	30	64	55	65	15	65	32	65	44	65	53	65	58	66	00	66
67	60	16	61	21	62	19	63	09	63	54	64	32	65	05	65	33	65	57	66	17	66	33	66	45	66	53	66	58	67	00	67
68	61	28	62	32	63	28	64	17	64	59	65	37	66	09	66	36	66	59	67	18	67	33	67	45	67	53	67	59	68	00	68
69	62	41	63	43	64	37	65	24	66	06	66	42	67	13	67	39	68	01	68	20	68	34	68	46	68	54	68	59	69	00	69
70	63	55	64	54	65	47	66	32	67	12	67	47	68	17	68	42	69	03	69	21	69	35	69	46	69	54	69	59	70	00	70
71	65	09	66	06	66	57	67	41	68	19	68	52	69	21	69	45	70	06	70	23	70	36	70	47	70	54	70	59	71	00	71
72	66	23	67	19	68	07	68	49	69	26	69	58	70	25	70	49	71	08	71	25	71	38	71	48	71	55	71	59	72	00	72
73	67	38	68	32	69	18	69	58	70	33	71	04	71	30	71	52	72	11	72	26	72	38	72	48	72	55	72	59	73	00	73
74	68	54	69	45	70	29	71	07	71	41	72	10	72	34	72	56	73	13	73	28	73	40	73	49	73	55	73	59	74	00	74
75	70	10	70	59	71	41	72	17	72	49	73	16	73	39	73	59	74	16	74	30	74	41	74	49	74	55	74	59	75	00	75
76	71	27	72	13	72	52	73	27	73	56	74	22	74	44	75	03	75	19	75	32	75	42	75	50	75	55	75	59	76	00	76
77	72	44	73	27	74	04	74	37	75	04	75	28	75	49	76	07	76	22	76	33	76	43	76	51	76	56	76	59	77	00	77
78	74	02	74	42	75	17	75	47	76	13	76	35	76	54	77	10	77	24	77	35	77	44	77	51	77	56	77	59	78	00	78
79	75	20	75	57	76	29	76	57	77	21	77	42	77	59	78	14	78	27	78	37	78	46	78	52	78	57	78	59	79	00	79
80	76	39	77	13	77	42	78	08	78	29	78	48	79	04	79	18	79	30	79	39	79	47	79	53	79	57	79	59	80	00	80
81	77	58	78	29	78	55	79	18	79	38	79	55	80	10	80	22	80	33	80	41	80	48	80	53	80	57	80	59	81	00	81
82	79	17	79	45	80	09	80	29	80	47	81	02	81	15	81	26	81	36	81	43	81	49	81	54	81	57	81	59	82	00	82
83	80	36	81	01	81	22	81	40	81	56	82	09	82	21	82	30	82	39	82	45	82	51	82	55	82	58	83	00	83	00	83
84	81	57	82	18	82	36	82	52	83	05	83	16	83	26	83	35	83	42	83	47	83	52	83	55	83	58	84	00	84	00	84
85	83	17	83	35	83	50	84	03	84	14	84	23	84	32	84	39	84	45	84	49	84	53	84	56	84	58	85	00	85	00	85
86	84	38	84	52	85	04	85	14	85	23	85	31	85	37	85	43	85	48	85	52	85	55	85	57	85	59	86	00	86	00	86
87	85	58	86	09	86	18	86	26	86	32	86	38	86	43	86	47	86	51	86	54	86	56	86	58	86	59	87	00	87	00	87
88	87	19	87	26	87	32	87	37	87	41	87	45	87	49	87	51	87	54	87	56	87	57	87	58	87	59	88	00	88	00	88
89	88	39	88	43	88	46	88	48	88	51	88	53	88	54	88	56	88	57	88	58	88	59	88	59	89	00	89	00	89	00	89
90	90	00	90	00	90	00	90	00	90	00	90	00	99	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90	00	90

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T. 22) Correcção da altura observada das Estrellas

Alt.	Elevação em metros															Alt.
	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	
0	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	0
8	9.08	9.38	9.65	9.90	10.13	10.35	10.55	10.73	10.93	11.10	11.27	11.43	11.60	11.75	11.90	8
9	8.40	8.70	8.97	9.22	9.45	9.67	9.87	10.05	10.25	10.42	10.58	10.75	10.92	11.07	11.22	9
10	7.83	8.13	8.40	8.65	8.88	9.10	9.30	9.48	9.68	9.85	10.01	10.18	10.35	10.50	10.65	10
11	7.37	7.67	7.93	8.18	8.42	8.63	8.83	9.01	9.22	9.38	9.55	9.72	9.88	10.03	10.18	11
12	6.97	7.27	7.53	7.78	8.01	8.23	8.43	8.62	8.82	8.98	9.15	9.32	9.48	9.63	9.78	12
13	6.63	6.93	7.20	7.45	7.68	7.90	8.10	8.28	8.48	8.65	8.82	8.98	9.15	9.30	9.45	13
14	6.33	6.63	6.90	7.15	7.38	7.60	7.80	7.98	8.18	8.35	8.52	8.68	8.85	9.00	9.15	14
15	6.07	6.37	6.63	6.88	7.11	7.33	7.53	7.72	7.92	8.08	8.25	8.42	8.58	8.73	8.88	15
16	5.85	6.15	6.42	6.67	6.90	7.11	7.32	7.50	7.70	7.87	8.03	8.20	8.37	8.52	8.67	16
17	5.65	5.95	6.22	6.47	6.70	6.92	7.11	7.30	7.50	7.67	7.83	8.00	8.17	8.32	8.47	17
18	5.47	5.77	6.03	6.28	6.52	6.73	6.93	7.11	7.32	7.48	7.65	7.82	7.98	8.13	8.28	18
19	5.30	5.60	5.87	6.11	6.35	6.57	6.77	6.95	7.15	7.32	7.48	7.65	7.82	7.97	8.11	19
20	5.14	5.45	5.72	5.97	6.20	6.42	6.62	6.80	7.00	7.17	7.33	7.50	7.67	7.82	7.97	20
22	4.88	5.18	5.45	5.70	5.93	6.15	6.35	6.53	6.73	6.90	7.07	7.23	7.40	7.55	7.70	22
25	4.57	4.87	5.13	5.38	5.62	5.83	6.03	6.22	6.42	6.58	6.75	6.92	7.08	7.23	7.38	25
30	4.18	4.48	4.75	5.00	5.23	5.45	5.65	5.83	6.03	6.20	6.37	6.57	6.73	6.88	7.03	30
35	3.88	4.18	4.45	4.70	4.93	5.15	5.35	5.53	5.73	5.90	6.07	6.23	6.40	6.55	6.70	35
40	3.65	3.95	4.22	4.47	4.70	4.92	5.11	5.30	5.50	5.67	5.83	6.00	6.17	6.32	6.47	40
45	3.47	3.77	4.03	4.28	4.52	4.73	4.93	5.11	5.32	5.48	5.65	5.82	5.98	6.13	6.28	45
50	3.32	3.62	3.88	4.13	4.37	4.58	4.78	4.97	5.17	5.33	5.50	5.67	5.83	5.98	6.13	50
55	3.18	3.48	3.75	4.00	4.23	4.45	4.65	4.83	5.03	5.20	5.37	5.53	5.70	5.85	6.00	55
60	3.07	3.37	3.63	3.88	4.11	4.33	4.53	4.72	4.92	5.13	5.30	5.47	5.63	5.78	5.97	60
65	2.95	3.25	3.52	3.77	4.00	4.22	4.42	4.60	4.80	4.97	5.13	5.30	5.47	5.62	5.77	65
70	2.85	3.15	3.42	3.67	3.90	4.11	4.32	4.50	4.70	4.87	5.03	5.20	5.37	5.52	5.67	70
80	2.67	2.97	3.23	3.48	3.72	3.93	4.13	4.32	4.52	4.68	4.85	5.01	5.18	5.33	5.48	80
90	2.50	2.80	3.07	3.32	3.55	3.77	3.97	4.15	4.35	4.52	4.68	4.85	5.01	5.17	5.32	90

T. 23) Reducção da parallaxe horizontal da Lua e semi-diametro para a Hora da observação

Diff.ª em 12 Horas	Hora de Greenwich depois do meio dia ou meia noite																Diff.ª em 12 Horas
	h m 0 10	h m 0 20	h m 0 30	h m 0 40	h m 0 50	h m 1 0	h m 2 0	h m 3 0	h m 4 0	h m 5 0	h m 6 0	h m 7 0	h m 8 0	h m 9 0	h m 10 0	h m 11 0	
″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
2	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	2
3	0	0	0	0	0	0	0	1	1	1	1	2	2	2	3	3	3
4	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3	4	4
5	0	0	0	0	0	0	1	1	2	2	2	3	3	4	4	5	5
6	0	0	0	0	0	0	1	1	2	2	3	3	4	5	5	6	6
7	0	0	0	0	0	1	1	2	2	3	3	4	5	5	6	6	7
8	0	0	0	0	1	1	1	2	3	3	4	5	5	6	7	7	8
9	0	0	0	0	1	1	1	2	3	4	4	5	6	7	8	8	9
10	0	0	0	1	1	1	2	2	3	4	5	6	7	8	8	9	10
11	0	0	0	1	1	1	2	3	4	5	5	6	7	8	9	10	11
12	0	0	0	1	1	1	2	3	4	5	6	7	8	9	10	11	12
13	0	0	1	1	1	1	2	3	4	5	6	8	9	10	11	12	13
14	0	0	1	1	1	1	2	3	5	6	7	8	9	11	12	13	14
15	0	0	1	1	1	1	2	4	5	6	7	9	10	11	13	14	15
16	0	0	1	1	1	1	3	4	5	7	8	9	11	12	13	15	16
17	0	0	1	1	1	1	3	4	6	7	8	10	11	13	14	16	17
18	0	0	1	1	1	1	3	4	6	7	9	11	12	14	15	17	18
19	0	1	1	1	1	2	3	5	6	8	9	11	13	14	16	17	19
20	0	1	1	1	1	2	3	5	7	8	10	12	13	15	17	18	20
21	0	1	1	1	2	2	3	5	7	9	10	12	14	16	18	19	21
22	0	1	1	1	2	2	4	5	7	9	11	13	15	17	18	20	22
23	0	1	1	1	2	2	4	6	8	10	11	13	15	17	19	21	23
24	0	1	1	1	2	2	4	6	8	10	12	14	16	18	20	22	24
25	0	1	1	1	2	2	4	6	8	10	12	15	17	19	21	23	25
26	0	1	1	1	2	2	4	6	9	11	13	15	17	20	22	24	26
27	0	1	1	1	2	2	4	7	9	11	13	16	18	20	23	25	27
28	0	1	1	2	2	2	5	7	9	12	14	16	19	21	23	26	28
29	0	1	1	2	2	2	5	7	10	12	14	17	19	22	24	27	29
30	0	1	1	2	2	2	5	7	10	12	15	17	20	23	25	28	30

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Correcção para a Hora da Preamar

T. 24)

Hora da passagem da Lua pelo Meridiano	Parallaxe horizontal da Lua							
	61′	60′	59′	58′	57′	56′	55′	54′
h h m	m	m	m	m	m	m	m	m
12 ou 0 00	− 4	− 3	− 2	− 1	− 0	+ 2	+ 4	+ 6
20	8	7	7	6	5	− 4	− 3	− 1
40	13	12	12	11	11	10	9	8
13 ou 1 00	18	17	17	17	17	16	16	15
20	22	22	22	22	22	22	22	22
40	27	27	28	28	28	29	29	29
14 ou 2 00	32	32	33	33	34	34	35	36
20	36	37	38	39	40	41	42	43
40	41	42	43	44	45	46	48	50
15 ou 3 00	45	46	47	49	50	52	54	57
20	48	50	51	53	55	57	60	63
40	53	54	56	57	59	62	65	68
16 ou 4 00	56	58	59	61	63	66	69	73
20	59	60	62	64	66	70	73	77
40	61	62	64	66	68	72	76	80
17 ou 5 00	61	63	65	67	69	73	77	81
20	62	63	65	67	69	73	77	81
40	60	61	63	65	67	71	75	78
18 ou 6 00	56	58	60	61	63	66	70	73
20	51	52	53	55	57	59	62	65
40	43	44	45	46	47	49	51	53
19 ou 7 00	33	34	34	35	35	36	37	39
20	22	22	22	22	22	22	22	22
40	11	11	10	− 10	− 9	− 8	− 7	− 6
20 ou 8 00	− 2	− 1	− 0	+ 1	+ 3	+ 5	+ 7	+ 9
20	+ 6	+ 8	+ 9	10	12	15	17	20
40	12	13	15	17	18	22	25	29
21 ou 9 00	15	17	19	21	23	26	30	31
20	17	19	21	23	25	28	32	36
40	17	19	21	23	25	29	33	37
22 ou 10 00	16	18	20	22	24	27	31	35
20	14	16	18	20	22	25	28	22
40	11	13	15	17	18	22	25	28
23 ou 11 00	8	10	11	13	14	17	20	24
20	6	6	7	9	10	13	15	18
40	+ 1	+ 2	+ 3	+ 4	+ 5	7	10	12
24 ou 12 00	− 1	− 3	− 2	− 1	− 0	+ 2	+ 4	+ 6

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
100	00 000	043	087	130	173	217	260	303	346	389
101	432	475	518	561	604	647	689	732	775	817
102	860	903	945	988	* 030	* 072	* 115	* 157	* 199	* 242
103	01 284	326	368	410	452	494	536	578	620	662
104	703	745	787	828	870	912	953	995	* 036	* 078
105	02 119	160	202	243	284	325	366	407	449	490
106	531	572	612	653	694	735	776	816	857	898
107	938	979	* 019	* 060	* 100	* 141	* 181	* 222	* 262	* 302
108	03 342	383	423	463	503	543	583	623	663	703
109	743	782	822	862	902	941	981	* 021	* 060	* 100
110	04 139	179	218	258	297	336	376	415	454	493
111	532	571	610	650	689	727	766	805	844	883
112	922	961	999	* 038	* 077	* 115	* 154	* 192	* 231	* 269
113	05 308	346	385	423	461	500	538	576	614	652
114	690	729	767	805	843	881	918	956	994	* 032
115	06 070	108	145	183	221	258	296	333	371	408
116	446	483	521	558	595	633	670	707	744	781
117	819	856	893	930	967	* 004	* 041	* 078	* 115	* 151
118	07 188	225	262	298	335	372	408	445	482	518
119	555	591	628	664	700	737	773	809	846	882
120	918	954	990	* 027	* 063	* 099	* 135	* 171	* 207	* 243
121	08 279	314	350	386	422	458	493	529	565	600
122	636	672	707	743	778	814	849	884	920	955
123	991	* 026	* 061	* 096	* 132	* 167	* 202	* 237	* 272	* 307
124	09 342	377	412	447	482	517	552	587	621	656
125	691	726	760	795	830	864	899	934	968	* 003
126	10 037	072	106	140	175	209	243	278	312	346
127	380	415	449	483	517	551	585	619	653	687
128	721	755	789	823	857	890	924	958	992	* 025
129	11 059	093	126	160	193	227	261	294	327	361
130	394	428	461	494	528	561	594	628	661	694
131	727	760	793	826	860	893	926	959	992	* 024
132	12 057	090	123	156	189	222	254	287	320	352
133	385	418	450	483	516	548	581	613	646	678
134	710	743	775	808	840	872	905	937	969	* 001
135	13 033	066	098	130	162	194	226	258	290	322
136	354	386	418	450	481	513	545	577	609	640
137	672	704	735	767	799	830	862	893	925	956
138	988	* 019	* 051	* 082	* 114	* 145	* 176	* 208	* 239	* 270
139	14 301	333	364	395	426	457	489	520	551	582
140	613	644	675	706	737	768	799	829	860	891
141	922	953	983	* 014	* 045	* 076	* 106	* 137	* 168	* 198
142	15 229	259	290	320	351	381	412	442	473	503
143	534	564	594	625	655	685	715	746	776	806
144	836	866	897	927	957	987	* 017	* 047	* 077	* 107
145	16 137	167	197	227	256	286	316	346	376	406
146	435	465	495	524	554	584	613	643	673	702
147	732	761	791	820	850	879	909	938	967	997
148	17 026	056	085	114	143	173	202	231	260	289
149	319	348	377	406	435	464	493	522	551	580
150	609	638	667	696	725	754	782	811	840	869
151	898	926	955	984	* 013	* 041	* 070	* 099	* 127	* 156
152	18 184	213	241	270	298	327	355	384	412	441
153	469	498	526	554	583	611	639	667	696	724
154	752	780	808	837	865	893	921	949	977	* 005
155	19 033	061	089	117	145	173	201	229	257	285
156	312	340	368	396	424	451	479	507	535	562
157	590	618	645	673	700	728	756	783	811	838
158	866	893	921	948	976	* 003	* 030	* 058	* 085	* 112
159	20 140	167	194	222	249	276	303	330	358	385
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	44	43	42
1	4.4	4.3	4.2
2	8.8	8.6	8.4
3	13.2	12.9	12.6
4	17.6	17.2	16.8
5	22.0	21.5	21.0
6	26.4	25.8	25.2
7	30.8	30.1	29.4
8	35.2	34.4	33.6
9	39.6	38.7	37.8

	41	40	39
1	4.1	4.0	3.9
2	8.2	8.0	7.8
3	12.3	12.0	11.7
4	16.4	16.0	15.6
5	20.5	20.0	19.5
6	24.6	24.0	23.4
7	28.7	28.0	27.3
8	32.8	32.0	31.2
9	36.9	36.0	35.1

	38	37	36
1	3.8	3.7	3.6
2	7.6	7.4	7.2
3	11.4	11.1	10.8
4	15.2	14.8	14.4
5	19.0	18.5	18.0
6	22.8	22.2	21.6
7	26.6	25.9	25.2
8	30.4	29.6	28.8
9	34.2	33.3	32.4

	35	34	33
1	3.5	3.4	3.3
2	7.0	6.8	6.6
3	10.5	10.2	9.9
4	14.0	13.6	13.2
5	17.5	17.0	16.5
6	21.0	20.4	19.8
7	24.5	23.8	23.1
8	28.0	27.2	26.4
9	31.5	30.6	29.7

	32	31	30
1	3.2	3.1	3.0
2	6.4	6.2	6.0
3	9.6	9.3	9.0
4	12.8	12.4	12.0
5	16.0	15.5	15.0
6	19.2	18.6	18.0
7	22.4	21.7	21.0
8	25.6	24.8	24.0
9	28.8	27.9	27.0

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
160	20 412	439	466	493	520	548	575	602	629	656
161	683	710	737	763	790	817	844	871	898	925
162	952	978	* 005	* 032	* 059	* 085	* 112	* 139	* 165	* 192
163	21 219	245	272	299	325	352	378	405	431	458
164	484	511	537	564	590	617	643	669	696	722
165	748	775	801	827	854	880	906	932	958	985
166	22 011	037	063	089	115	141	167	194	220	246
167	272	298	324	350	376	401	427	453	479	505
168	531	557	583	608	634	660	686	712	737	763
169	789	814	840	866	891	917	943	968	994	* 019
170	23 045	070	096	121	147	172	198	223	249	274
171	300	325	350	376	401	426	452	477	502	528
172	553	578	603	629	654	679	704	729	754	779
173	805	830	855	880	905	930	955	980	* 005	* 030
174	24 055	080	105	130	155	180	204	229	254	279
175	304	329	353	378	403	428	452	477	502	527
176	551	576	601	625	650	674	699	724	748	773
177	797	822	846	871	895	920	944	969	993	* 018
178	25 042	066	091	115	139	164	188	212	237	261
179	285	310	334	358	382	406	431	455	479	503
180	527	551	575	600	624	648	672	696	720	744
181	768	792	816	840	864	888	912	935	959	983
182	26 007	031	055	079	102	126	150	174	198	221
183	245	269	293	316	340	364	387	411	435	458
184	482	505	529	553	576	600	623	647	670	694
185	717	741	764	788	811	834	858	881	905	928
186	951	975	998	* 021	* 045	* 068	* 091	* 114	* 138	* 161
187	27 184	207	231	254	277	300	323	346	370	393
188	416	439	462	485	508	531	554	577	600	623
189	646	669	692	715	738	761	784	807	830	852
190	875	898	921	944	967	989	* 012	* 035	* 058	* 081
191	28 103	126	149	171	194	217	240	262	285	307
192	330	353	375	398	421	443	466	488	511	533
193	556	578	601	623	646	668	691	713	735	758
194	780	803	825	847	870	892	914	937	959	981
195	29 003	026	048	070	092	115	137	159	181	203
196	226	248	270	292	314	336	358	380	403	425
197	447	469	491	513	535	557	579	601	623	645
198	667	688	710	732	754	776	798	820	842	863
199	885	907	929	951	973	994	* 016	* 038	* 060	* 081
200	30 103	125	146	168	190	211	233	255	276	298
201	320	341	363	384	406	428	449	471	492	514
202	535	557	578	600	621	643	664	685	707	728
203	750	771	792	814	835	856	878	899	920	942
204	963	984	* 006	* 027	* 048	* 069	* 091	* 112	* 133	* 154
205	31 175	197	218	239	260	281	302	323	345	366
206	387	408	429	450	471	492	513	534	555	576
207	597	618	639	660	681	702	723	744	765	785
208	806	827	848	869	890	911	931	952	973	994
209	32 015	035	056	077	098	118	139	160	181	201
210	222	243	263	284	305	325	346	366	387	408
211	428	449	469	490	510	531	552	572	593	613
212	634	654	675	695	715	736	756	777	797	818
213	838	858	879	899	919	940	960	980	* 001	* 021
214	33 041	062	082	102	122	143	163	183	203	224
215	244	264	284	304	325	345	365	385	405	425
216	445	465	486	506	526	546	566	586	606	626
217	646	666	686	706	726	746	766	786	806	826
218	846	866	885	905	925	945	965	985	* 005	* 025
219	34 044	064	084	104	124	143	163	183	203	223
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	29	28	27
1	2.9	2.8	2.7
2	5.8	5.6	5.4
3	8.7	8.4	8.1
4	11.6	11.2	10.8
5	14.5	14.0	13.5
6	17.4	16.8	16.2
7	20.3	19.6	18.9
8	23.2	22.4	21.6
9	26.1	25.2	24.3

	26	25	24
1	2.6	2.5	2.4
2	5.2	5.0	4.8
3	7.8	7.5	7.2
4	10.4	10.0	9.6
5	13.0	12.5	12.0
6	15.6	15.0	14.4
7	18.2	17.5	16.8
8	20.8	20.0	19.2
9	23.4	22.5	21.6

	23	22	21
1	2.3	2.2	2.1
2	4.6	4.4	4.2
3	6.9	6.6	6.3
4	9.2	8.8	8.4
5	11.5	11.0	10.5
6	13.8	13.2	12.6
7	16.1	15.4	14.7
8	18.4	17.6	16.8
9	20.7	19.8	18.9

	20	19
1	2.0	1.9
2	4.0	3.8
3	6.0	5.7
4	8.0	7.6
5	10.0	9.5
6	12.0	11.4
7	14.0	13.3
8	16.0	15.2
9	18.0	17.1

P. p.

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
220	34 242	262	282	301	321	341	361	380	400	420
221	439	459	479	498	518	537	557	577	596	616
222	635	655	674	694	713	733	753	772	792	811
223	830	850	869	889	908	928	947	967	986	* 005
224	35 025	044	064	083	102	122	141	160	180	199
225	218	238	257	276	295	315	334	353	372	392
226	411	430	449	468	488	507	526	545	564	583
227	603	622	641	660	679	698	717	736	755	774
228	793	813	832	851	870	889	908	927	946	965
229	984	* 003	* 021	* 040	* 059	* 078	* 097	* 116	* 135	* 154
230	36 173	192	211	229	248	267	286	305	324	342
231	361	380	399	418	436	455	474	493	511	530
232	549	568	586	605	624	642	661	680	698	717
233	736	754	773	791	810	829	847	866	884	903
234	922	940	959	977	996	* 014	* 033	051	* 070	* 088
235	37 107	125	144	162	181	199	218	236	254	273
236	291	310	328	346	365	383	401	420	438	457
237	475	493	511	530	548	566	585	603	621	639
238	658	676	694	712	731	749	767	785	803	822
239	840	858	876	894	912	931	949	967	985	* 003
240	38 021	039	057	075	093	112	130	148	166	184
241	202	220	238	256	274	292	310	328	346	364
242	382	399	417	435	453	471	489	507	525	543
243	561	578	596	614	632	650	668	686	703	721
244	739	757	775	792	810	828	846	863	881	899
245	917	934	952	970	987	* 005	* 023	* 041	* 058	* 076
246	39 094	111	129	146	164	182	199	217	235	252
247	270	287	305	322	340	358	375	393	410	428
248	445	463	480	498	515	533	550	568	585	602
249	620	637	655	672	690	707	724	742	759	777
250	794	811	829	846	863	881	898	915	933	950
251	967	985	* 002	* 019	* 037	* 054	* 071	* 088	* 106	* 123
252	40 140	157	175	192	209	226	243	261	278	295
253	312	329	346	364	381	398	415	432	449	466
254	483	500	518	535	552	569	586	603	620	637
255	654	671	688	705	722	739	756	773	790	807
256	824	841	858	875	892	909	926	943	960	976
257	993	* 010	* 027	* 044	* 061	* 078	* 095	* 111	* 128	* 145
258	41 162	179	196	212	229	246	263	280	296	313
259	330	347	363	380	397	414	430	447	464	481
260	497	514	531	547	564	581	597	614	631	647
261	664	681	697	714	731	747	764	780	797	814
262	830	847	863	880	896	913	929	946	963	979
263	996	* 012	* 029	* 045	* 062	* 078	* 095	* 111	* 127	* 144
264	42 160	177	193	210	226	243	259	275	292	308
265	325	341	357	374	390	406	423	439	455	472
266	488	504	521	537	553	570	586	602	619	635
267	651	667	684	700	716	732	749	765	781	797
268	813	830	846	862	878	894	911	927	943	959
269	975	991	* 008	* 024	* 040	* 056	* 072	* 088	* 104	* 120
270	43 136	152	169	185	201	217	233	249	265	281
271	297	313	329	345	361	377	393	409	425	441
272	457	473	489	505	521	537	553	569	584	600
273	616	632	648	664	680	696	712	727	743	759
274	775	791	807	823	838	854	870	886	902	917
275	933	949	965	981	996	* 012	* 028	* 044	* 059	* 075
276	44 091	107	122	138	154	170	185	201	217	232
277	248	264	279	295	311	326	342	358	373	389
278	404	420	436	451	467	483	498	514	529	545
279	560	576	592	607	623	638	654	669	685	700
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	20	19
1	2.0	1.9
2	4.0	3.8
3	6.0	5.7
4	8.0	7.6
5	10.0	9.5
6	12.0	11.4
7	14.0	13.3
8	16.0	15.2
9	18.0	17.1

	18	17
1	1.8	1.7
2	3.6	3.4
3	5.4	5.1
4	7.2	6.8
5	9.0	8.5
6	10.8	10.2
7	12.6	11.9
8	14.4	13.6
9	16.2	15.3

	16
1	1.6
2	3.2
3	4.8
4	6.4
5	8.0
6	9.6
7	11.2
8	12.8
9	14.4

	15
1	1.5
2	3.0
3	4.5
4	6.0
5	7.5
6	9.0
7	10.5
8	12.0
9	13.5

P. p.

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
280	44 716	731	747	762	778	793	809	824	840	855
281	871	886	902	917	932	948	963	979	994	* 010
282	45 025	040	056	071	086	102	117	133	148	163
283	179	194	209	225	240	255	271	286	301	317
284	332	347	362	378	393	408	423	439	454	469
285	484	500	515	530	545	561	576	591	606	621
286	637	652	667	682	697	712	728	743	758	773
287	788	803	818	834	849	864	879	894	909	924
288	939	954	969	984	* 000	* 015	* 030	* 045	* 060	* 075
289	46 090	105	120	135	150	165	180	195	210	225
290	240	255	270	285	300	315	330	345	359	374
291	389	404	419	434	449	464	479	494	509	523
292	538	553	568	583	598	613	627	642	657	672
293	687	702	716	731	746	761	776	790	805	820
294	835	850	864	879	894	909	923	938	953	967
295	982	997	* 012	* 026	* 041	* 056	* 070	* 085	* 100	* 114
296	47 126	144	159	173	188	202	217	232	246	261
297	276	290	305	319	334	349	363	378	392	407
298	422	436	451	465	480	494	509	524	538	553
299	567	582	596	611	625	640	654	669	683	698
300	712	727	741	756	770	784	799	813	828	842
301	857	871	885	900	914	929	943	958	972	986
302	48 001	015	029	044	058	073	087	101	116	130
303	144	159	173	187	202	216	230	244	259	273
304	287	302	316	330	344	359	373	387	401	416
305	430	444	458	473	487	501	515	530	544	558
306	572	586	601	615	629	643	657	671	686	700
307	714	728	742	756	770	785	799	813	827	841
308	855	869	883	897	911	926	940	954	968	982
309	996	* 010	* 024	* 038	* 052	* 066	* 080	* 094	* 108	* 122
310	49 136	150	164	178	192	206	220	234	248	262
311	276	290	304	318	332	346	360	374	388	402
312	415	429	443	457	471	485	499	513	527	541
313	554	568	582	596	610	624	638	651	665	679
314	693	707	721	734	748	762	776	790	803	817
315	831	845	859	872	886	900	914	927	941	955
316	969	982	996	* 010	* 024	* 037	* 051	* 065	* 079	* 092
317	50 106	120	133	147	161	174	188	202	215	229
318	243	256	270	284	297	311	325	338	352	365
319	379	393	406	420	433	447	461	474	488	501
320	515	529	542	556	569	583	596	610	623	637
321	651	664	678	691	705	718	732	745	759	772
322	786	799	813	826	840	853	866	880	893	907
323	920	934	947	961	974	987	* 001	* 014	* 028	* 041
324	51 055	068	081	095	108	121	135	148	162	175
325	188	202	215	228	242	255	268	282	295	308
326	322	335	348	362	375	388	402	415	428	441
327	455	468	481	495	508	521	534	548	561	574
328	587	601	614	627	640	654	667	680	693	706
329	720	733	746	759	772	786	799	812	825	838
330	851	865	878	891	904	917	930	943	957	970
331	983	996	* 009	* 022	* 035	* 048	* 061	* 075	* 088	* 101
332	52 114	127	140	153	166	179	192	205	218	231
333	244	257	270	284	297	310	323	336	349	362
334	375	388	401	414	427	440	453	466	479	492
335	504	517	530	543	556	569	582	595	608	621
336	634	647	660	673	686	699	711	724	737	750
337	763	776	789	802	815	827	840	853	866	879
338	892	905	917	930	943	956	969	982	994	* 007
339	53 020	033	046	058	071	084	097	110	122	135
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	16	15
1	1.6	1.5
2	3.2	3.0
3	4.8	4.5
4	6.4	6.0
5	8.0	7.5
6	9.6	9.0
7	11.2	10.5
8	12.8	12.0
9	14.4	13.5

	14	13
1	1.4	1.3
2	2.8	2.6
3	4.2	3.9
4	5.6	5.2
5	7.0	6.5
6	8.4	7.8
7	9.8	9.1
8	11.2	10.4
9	12.6	11.9

	12
1	1.2
2	2.4
3	3.6
4	4.8
5	6.0
6	7.2
7	8.4
8	9.6
9	10.8

P. p.

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
340	53 148	161	173	186	199	212	224	237	250	263
341	275	288	301	314	326	339	352	364	377	390
342	403	415	428	441	453	466	479	491	504	517
343	529	542	555	567	580	593	605	618	631	643
344	656	668	681	694	706	719	732	744	757	769
345	782	794	807	820	832	845	857	870	882	895
346	908	920	933	945	958	970	983	995	* 008	* 020
347	54 033	045	058	070	083	095	108	120	133	145
348	158	170	183	195	208	220	233	245	258	270
349	283	295	307	320	332	345	357	370	382	394
350	407	419	432	444	456	469	481	494	506	518
351	531	543	555	568	580	593	605	617	630	642
352	654	667	679	691	704	716	728	741	753	765
353	777	790	802	814	827	839	851	864	876	888
354	900	913	925	937	949	962	974	986	998	* 011
355	55 023	035	047	060	072	084	096	108	121	133
356	145	157	169	182	194	206	218	230	242	255
357	267	279	291	303	315	328	340	352	364	376
358	388	400	413	425	437	449	461	473	485	497
359	509	522	534	546	558	570	582	594	606	618
360	630	642	654	666	678	691	703	715	727	739
361	751	763	775	787	799	811	823	835	847	859
362	871	883	895	907	919	931	943	955	967	979
363	991	* 003	* 015	* 027	* 038	* 050	* 062	* 074	* 086	* 098
364	56 110	122	134	146	158	170	182	194	205	217
365	229	241	253	265	277	289	301	312	324	336
366	348	360	372	384	396	407	419	431	443	455
367	467	478	490	502	514	526	538	549	561	573
368	585	597	608	620	632	644	656	667	679	691
369	703	714	726	738	750	761	773	785	797	808
370	820	832	844	855	867	879	891	902	914	926
371	937	949	961	972	984	996	* 008	* 019	* 031	* 043
372	57 054	066	078	089	101	113	124	136	148	159
373	171	183	194	206	217	229	241	252	264	276
374	287	299	310	322	334	345	357	368	380	392
375	403	415	426	438	449	461	473	484	496	507
376	519	530	542	553	565	576	588	600	611	623
377	634	646	657	669	680	692	703	715	726	738
378	749	761	772	784	795	807	818	830	841	852
379	864	875	887	898	910	921	933	944	955	967
380	978	990	* 001	* 013	* 024	* 035	* 047	* 058	* 070	* 081
381	58 092	104	115	127	138	149	161	172	184	195
382	206	218	229	240	252	263	274	286	297	309
383	320	331	343	354	365	377	388	399	410	422
384	433	444	456	467	478	490	501	512	524	535
385	546	557	569	580	591	602	614	625	636	647
386	659	670	681	692	704	715	726	737	749	760
387	771	782	794	805	816	827	838	850	861	872
388	883	894	906	917	928	939	950	961	973	984
389	995	* 006	* 017	* 028	* 040	* 051	* 062	* 073	* 084	* 095
390	59 106	118	129	140	151	162	173	184	195	207
391	218	229	240	251	262	273	284	295	306	318
392	329	340	351	362	373	384	395	406	417	428
393	439	450	461	472	483	494	506	517	528	539
394	550	561	572	583	594	605	616	627	638	649
395	660	671	682	693	704	715	726	737	748	759
396	770	780	791	802	813	824	835	846	857	868
397	879	890	901	912	923	934	945	956	966	977
398	988	999	* 010	* 021	* 032	* 043	* 054	* 065	* 076	* 086
399	60 097	108	119	130	141	152	163	173	184	195
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	13	12	11	10
1	1.3	1.2	1.1	1.0
2	2.6	2.4	2.2	2.0
3	3.9	3.6	3.3	3.0
4	5.2	4.8	4.4	4.0
5	6.5	6.0	5.5	5.0
6	7.8	7.2	6.6	6.0
7	9.1	8.4	7.7	7.0
8	10.4	9.6	8.8	8.0
9	11.7	10.8	9.9	9.0

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
400	60 206	217	228	239	249	260	271	282	293	304
401	314	325	336	347	358	369	379	390	401	412
402	423	433	444	455	466	477	487	498	509	520
403	531	541	552	563	574	584	595	606	617	627
404	638	649	660	670	681	692	703	713	724	735
405	746	756	767	778	788	799	810	821	831	842
406	853	863	874	885	895	906	917	927	938	949
407	959	970	981	991	* 002	* 013	* 023	* 034	* 045	* 055
408	61 066	077	087	098	109	119	130	140	151	162
409	172	183	194	204	215	225	236	247	257	268
410	278	289	300	310	321	331	342	352	363	374
411	384	395	405	416	426	437	448	458	469	479
412	490	500	511	521	532	542	553	563	574	584
413	595	606	616	627	637	648	658	669	679	690
414	700	711	721	731	742	752	763	773	784	794
415	805	815	826	836	847	857	868	878	888	899
416	909	920	930	941	951	962	972	982	993	* 003
417	62 014	024	034	045	055	066	076	086	097	107
418	118	128	138	149	159	170	180	190	201	211
419	221	232	242	252	263	273	284	294	304	315
420	325	335	346	356	366	377	387	397	408	418
421	428	439	449	459	469	480	490	500	511	521
422	531	542	552	562	572	583	593	603	613	624
423	634	644	655	665	675	685	696	706	716	726
424	737	747	757	767	778	788	798	808	818	829
425	839	849	859	870	880	890	900	910	921	931
426	941	951	961	972	982	992	* 002	* 012	* 022	* 033
427	63 043	053	063	073	083	094	104	114	124	134
428	144	155	165	175	185	195	205	215	225	236
429	246	256	266	276	286	296	306	317	327	337
430	347	357	367	377	387	397	407	417	428	438
431	448	458	468	478	488	498	508	518	528	538
432	548	558	568	579	589	599	609	619	629	639
433	649	659	669	679	689	699	709	719	729	739
434	749	759	769	779	789	799	809	819	829	839
435	849	859	869	879	889	899	909	919	929	939
436	949	959	969	979	988	998	* 008	* 018	* 028	* 038
437	64 048	058	068	078	088	098	108	118	128	137
438	147	157	167	177	187	197	207	217	227	237
439	246	256	266	276	286	296	306	316	326	335
440	345	355	365	375	385	395	404	414	424	434
441	444	454	464	473	483	493	503	513	523	532
442	542	552	562	572	582	591	601	611	621	631
443	640	650	660	670	680	689	699	709	719	729
444	738	748	758	768	777	787	797	807	816	826
445	836	846	856	865	875	885	895	904	914	924
446	933	943	953	963	972	982	992	* 002	* 011	* 021
447	65 031	040	050	060	070	079	089	099	108	118
448	128	137	147	157	167	176	186	196	205	215
449	225	234	244	254	263	273	283	292	302	312
450	321	331	341	350	360	369	379	389	398	408
451	418	427	437	447	456	466	475	485	495	504
452	514	523	533	543	552	562	571	581	591	600
453	610	619	629	639	648	658	667	677	686	696
454	706	715	725	734	744	753	763	772	782	792
455	801	811	820	830	839	849	858	868	877	887
456	896	906	916	925	935	944	954	963	973	982
457	992	* 001	* 011	* 020	* 030	* 039	* 049	* 058	* 068	* 077
458	66 087	096	106	115	124	134	143	153	162	172
459	181	191	200	210	219	229	238	247	257	266

P. p.

11	
1	1.1
2	2.2
3	3.3
4	4.4
5	5.5
6	6.6
7	7.7
8	8.8
9	9.9

10	
1	1.0
2	2.0
3	3.0
4	4.0
5	5.0
6	6.0
7	7.0
8	8.0
9	9.0

9	
1	0.9
2	1.8
3	2.7
4	3.6
5	4.5
6	5.4
7	6.3
8	7.2
9	8.1

N. 0 1 2 3 4 5 6 7 8 9 P. p.

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
460	66 276	285	295	304	314	323	332	342	351	361
461	370	380	389	398	408	417	427	436	445	455
462	464	474	483	492	502	511	521	530	539	549
463	558	567	577	586	596	605	614	624	633	642
464	652	661	671	680	689	699	708	717	727	736
465	745	755	764	773	783	792	801	811	820	829
466	839	848	857	867	876	885	894	904	913	922
467	932	941	950	960	969	978	987	997	* 006	* 015
468	67 025	034	043	052	062	071	080	089	099	108
469	117	127	136	145	154	164	173	182	191	201
470	210	219	228	237	247	256	265	274	284	293
471	302	311	321	330	339	348	357	367	376	385
472	394	403	413	422	431	440	449	459	468	477
473	486	495	504	514	523	532	541	550	560	569
474	578	587	596	605	614	624	633	642	651	660
475	669	679	688	697	706	715	724	733	742	752
476	761	770	779	788	797	806	815	825	834	843
477	852	861	870	879	888	897	906	916	925	934
478	943	952	961	970	979	988	997	* 006	* 015	* 024
479	68 034	043	052	061	070	079	088	097	106	115
480	124	133	142	151	160	169	178	187	196	205
481	215	224	233	242	251	260	269	278	287	296
482	305	314	323	332	341	350	359	368	377	386
483	395	404	413	422	431	440	449	458	467	476
484	485	494	502	511	520	529	538	547	556	565
485	574	583	592	601	610	619	628	637	646	655
486	664	673	681	690	699	708	717	726	735	744
487	753	762	771	780	789	797	806	815	824	833
488	842	851	860	869	878	886	895	904	913	922
489	931	940	949	958	966	975	984	993	* 002	* 011
490	69 020	028	037	046	055	064	073	082	090	099
491	108	117	126	135	144	152	161	170	179	188
492	197	205	214	223	232	241	249	258	267	276
493	285	294	302	311	320	329	338	346	355	364
494	373	381	390	399	408	417	425	434	443	452
495	461	469	478	487	496	504	513	522	531	539
496	548	557	566	574	583	592	601	609	618	627
497	636	644	653	662	671	679	688	697	705	714
498	723	732	740	749	758	767	775	784	793	801
499	810	819	827	836	845	854	862	871	880	888
500	897	906	914	923	932	940	949	958	966	975
501	984	992	* 001	* 010	* 018	* 027	* 036	* 044	* 053	* 062
502	70 070	079	088	096	105	114	122	131	140	148
503	157	165	174	183	191	200	209	217	226	234
504	243	252	260	269	278	286	295	303	312	321
505	329	338	346	355	364	372	381	389	398	406
506	415	424	432	441	449	458	467	475	484	492
507	501	509	518	526	535	544	552	561	569	578
508	586	595	603	612	621	629	638	646	655	663
509	672	680	689	697	706	714	723	731	740	749
510	757	766	774	783	791	800	808	817	825	834
511	842	851	859	868	876	885	893	902	910	919
512	927	935	944	952	961	969	978	986	995	* 003
513	71 012	020	029	037	046	054	063	071	079	088
514	096	105	113	122	130	139	147	155	164	172
515	181	189	198	206	214	223	231	240	248	257
516	265	273	282	290	299	307	315	324	332	341
517	349	357	366	374	383	391	399	408	416	425
518	433	441	450	458	466	475	483	492	500	508
519	517	525	533	542	550	559	567	575	584	592
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	10	9	8
1	1.0	0.9	0.8
2	2.0	1.8	1.6
3	3.0	2.7	2.4
4	4.0	3.6	3.2
5	5.0	4.5	4.0
6	6.0	5.4	4.8
7	7.0	6.3	5.6
8	8.0	7.2	6.4
9	9.0	8.1	7.2

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
520	71 600	609	617	625	634	642	650	659	667	675
521	684	692	700	709	717	725	734	742	750	759
522	767	775	784	792	800	809	817	825	834	842
523	850	858	867	875	883	892	900	908	917	925
524	933	941	950	958	966	975	983	991	999	* 008
525	72 016	024	032	041	049	057	066	074	082	090
526	099	107	115	123	132	140	148	156	165	173
527	181	189	198	206	214	222	230	239	247	255
528	263	272	280	288	296	304	313	321	329	337
529	346	354	362	370	378	387	395	403	411	419
530	428	436	444	452	460	469	477	485	493	501
531	509	518	526	534	542	550	558	567	575	583
532	591	599	607	616	624	632	640	648	656	665
533	673	681	689	697	705	713	722	730	738	746
534	754	762	770	779	787	795	803	811	819	827
535	835	843	852	860	868	876	884	892	900	908
536	916	925	933	941	949	957	965	973	981	989
537	997	* 006	* 014	* 022	* 030	* 038	* 046	* 054	* 062	* 070
538	73 078	086	094	102	111	119	127	135	143	151
539	159	167	175	183	191	199	207	215	223	231
540	239	247	255	263	272	280	288	296	304	312
541	320	328	336	344	352	360	368	376	384	392
542	400	408	416	424	432	440	448	456	464	472
543	480	488	496	504	512	520	528	536	544	552
544	560	568	576	584	592	600	608	616	624	632
545	640	648	656	664	672	679	687	695	703	711
546	719	727	735	743	751	759	767	775	783	791
547	799	807	815	823	830	838	846	854	862	870
548	878	886	894	902	910	918	926	933	941	949
549	957	965	973	981	989	997	* 005	* 013	* 020	* 028
550	74 036	044	052	060	068	076	084	092	099	107
551	115	123	131	139	147	155	162	170	178	186
552	194	202	210	218	225	233	241	249	257	265
553	273	280	288	296	304	312	320	327	335	343
554	351	359	367	374	382	390	398	406	414	421
555	429	437	445	453	461	468	476	484	492	500
556	507	515	523	531	539	547	554	562	570	578
557	586	593	601	609	617	624	632	640	648	656
558	663	671	679	687	695	702	710	718	726	733
559	741	749	757	764	772	780	788	796	803	811
560	819	827	834	842	850	858	865	873	881	889
561	896	904	912	920	927	935	943	950	958	966
562	974	981	989	997	* 005	* 012	* 020	* 028	* 035	* 043
563	75 051	059	066	074	082	089	097	105	113	120
564	128	136	143	151	159	166	174	182	189	197
565	205	213	220	228	236	243	251	259	266	274
566	282	289	297	305	312	320	328	335	343	351
567	358	366	374	381	389	397	404	412	420	427
568	435	442	450	458	465	473	481	488	496	504
569	511	519	526	534	542	549	557	565	572	580
570	587	595	603	610	618	626	633	641	648	656
571	664	671	679	686	694	702	709	717	724	732
572	740	747	755	762	770	778	785	793	800	808
573	815	823	831	838	846	853	861	868	876	884
574	891	899	906	914	921	929	937	944	952	959
575	967	974	982	989	997	* 005	* 012	* 020	* 027	* 035
576	76 042	050	057	065	072	080	087	095	103	110
577	118	125	133	140	148	155	163	170	178	185
578	193	200	208	215	223	230	238	245	253	260
579	268	275	283	290	298	305	313	320	328	335
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	9	8	7
1	0.9	0.8	0.7
2	1.8	1.6	1.4
3	2.7	2.4	2.1
4	3.6	3.2	2.8
5	4.5	4.0	3.5
6	5.4	4.8	4.2
7	6.3	5.6	4.9
8	7.2	6.4	5.6
9	8.1	7.2	6.3

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
580	76 343	350	358	365	373	380	388	395	403	410
581	418	425	433	440	448	455	462	470	477	485
582	492	500	507	515	522	530	537	545	552	559
583	567	574	582	589	597	604	612	619	626	634
584	641	649	656	664	671	678	686	693	701	708
585	716	723	730	738	745	753	760	768	775	782
586	790	797	805	812	819	827	834	842	849	856
587	864	871	879	886	893	901	908	916	923	930
588	938	945	953	960	967	975	982	989	997	* 004
589	77 012	019	026	034	041	048	056	063	070	078
590	085	093	100	107	115	122	129	137	144	151
591	159	166	173	181	188	195	203	210	217	225
592	232	240	247	254	262	269	276	283	291	298
593	305	313	320	327	335	342	349	357	364	371
594	379	386	393	401	408	415	422	430	437	444
595	452	459	466	474	481	488	495	503	510	517
596	525	532	539	546	554	561	568	576	583	590
597	597	605	612	619	627	634	641	648	656	663
598	670	677	685	692	699	706	714	721	728	735
599	743	750	757	764	772	779	786	793	801	808
600	815	822	830	837	844	851	859	866	873	880
601	887	895	902	909	916	924	931	938	945	952
602	960	967	974	981	988	996	* 003	* 010	* 017	* 025
603	78 032	039	046	053	061	068	075	082	089	097
604	104	111	118	125	132	140	147	154	161	168
605	176	183	190	197	204	211	219	226	233	240
606	247	254	262	269	276	283	290	297	305	312
607	319	326	333	340	347	355	362	369	376	383
608	390	398	405	412	419	426	433	440	447	455
609	462	469	476	483	490	497	504	512	519	526
610	533	540	547	554	561	569	576	583	590	597
611	604	611	618	625	633	640	647	654	661	668
612	675	682	689	696	704	711	718	725	732	739
613	746	753	760	767	774	781	789	796	803	810
614	817	824	831	838	845	852	859	866	873	880
615	888	895	902	909	916	923	930	937	944	951
616	958	965	972	979	986	993	* 000	* 007	* 014	* 021
617	79 029	036	043	050	057	064	071	078	085	092
618	099	106	113	120	127	134	141	148	155	162
619	169	176	183	190	197	204	211	218	225	232
620	239	246	253	260	267	274	281	288	295	302
621	309	316	323	330	337	344	351	358	365	372
622	379	386	393	400	407	414	421	428	435	442
623	449	456	463	470	477	484	491	498	505	511
624	518	525	532	539	546	553	560.	567	574	581
625	588	595	602	609	616	623	630	637	644	650
626	657	664	671	678	685	692	699	706	713	720
627	727	734	741	748	754	761	768	775	782	789
628	796	803	810	817	824	831	837	844	851	858
629	865	872	879	886	893	900	906	913	920	927
630	934	941	948	955	962	969	975	982	989	996
631	80 003	010	017	024	030	037	044	051	058	065
632	072	079	085	092	099	106	113	120	127	134
633	140	147	154	161	168	175	182	188	195	202
634	209	216	223	229	236	243	250	257	264	271
635	277	284	291	298	305	312	318	325	332	339
636	346	353	359	366	373	280	387	393	400	407
637	414	421	428	434	441	448	455	462	468	475
638	482	489	496	502	509	516	523	530	536	543
639	550	557	564	570	577	584	591	598	604	611
N.	0	1	2	3	4	5	6	7	8	9

P. p.

8

1	0.8
2	1.6
3	2.4
4	3.2
5	4.0
6	4.8
7	5.6
8	6.4
9	7.2

7

1	0.7
2	1.4
3	2.1
4	2.8
5	3.5
6	4.2
7	4.9
8	5.6
9	6.3

6

1	0.6
2	1.2
3	1.8
4	2.4
5	3.0
6	3.6
7	4.2
8	4.8
9	5.4

P. p.

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
640	80 618	625	632	638	645	652	659	665	672	679
641	686	693	699	706	713	720	726	733	740	747
642	754	760	767	774	781	787	794	801	808	814
643	821	828	835	811	848	855	862	868	875	882
644	889	895	902	909	916	922	929	936	943	949
645	956	963	969	976	983	990	996	* 003	* 010	* 017
646	81 023	030	037	043	050	057	064	070	077	084
647	090	097	104	111	117	124	131	137	144	151
648	158	164	171	178	184	191	198	204	211	218
649	224	231	238	245	251	258	265	271	278	285
650	291	298	305	311	318	325	331	338	345	351
651	358	365	371	378	385	391	398	405	411	418
652	425	431	438	445	451	458	465	471	478	485
653	491	498	505	511	518	525	531	538	544	551
654	558	564	571	578	584	591	598	604	611	617
655	624	631	637	644	651	657	664	671	677	684
656	690	697	704	710	717	723	730	737	743	750
657	757	763	770	776	783	790	796	803	809	816
658	823	829	836	842	849	856	862	869	875	882
659	889	895	902	908	915	921	928	935	941	948
660	954	961	968	974	981	987	994	* 000	* 007	* 014
661	82 020	027	033	040	046	053	060	066	073	079
662	086	092	099	105	112	119	125	132	138	145
663	151	158	164	171	178	184	191	197	204	210
664	217	223	230	236	243	249	256	263	269	276
665	282	289	295	302	308	315	321	328	334	341
666	347	354	360	367	373	380	387	393	400	406
667	413	419	426	432	439	445	452	458	465	471
668	478	484	491	497	504	510	517	523	530	536
669	543	549	556	562	569	575	582	588	595	601
670	607	614	620	627	633	640	646	653	659	666
671	672	679	685	692	698	705	711	718	724	730
672	737	743	750	756	763	769	776	782	789	795
673	802	808	814	821	827	834	840	847	853	860
674	866	872	879	885	892	898	905	911	918	924
675	930	937	943	950	956	963	969	975	982	988
676	995	* 001	* 008	* 014	* 020	* 027	* 033	* 040	* 046	* 052
677	83 059	065	072	078	085	091	097	104	110	117
678	123	129	136	142	149	155	161	168	174	181
679	187	193	200	206	213	219	225	232	238	245
680	251	257	264	270	276	283	289	296	302	308
681	315	321	327	334	340	347	353	359	366	372
682	378	385	391	398	404	410	417	423	429	436
683	442	448	455	461	467	474	480	487	493	499
684	506	512	518	525	531	537	544	550	556	563
685	569	575	582	588	594	601	607	613	620	626
686	632	639	645	651	658	664	670	677	683	689
687	696	702	708	715	721	727	734	740	746	753
688	759	765	771	778	784	790	797	803	809	816
689	822	828	835	841	847	853	860	866	872	879
690	885	891	897	904	910	916	923	929	935	942
691	948	954	960	967	973	979	985	992	998	* 004
692	84 011	017	023	029	036	042	048	055	061	067
693	073	080	086	092	098	105	111	117	123	130
694	136	142	148	155	161	167	173	180	186	192
695	198	205	211	217	223	230	236	242	248	255
696	261	267	273	280	286	292	298	305	311	317
697	323	330	336	342	348	354	361	367	373	379
698	386	392	398	404	410	417	423	429	435	442
699	448	454	460	466	473	479	485	491	497	504
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	7
1	0.7
2	1.4
3	2.1
4	2.8
5	3.5
6	4.2
7	4.9
8	5.6
9	6.3

	6
1	0.6
2	1.2
3	1.8
4	2.4
5	3.0
6	3.6
7	4.2
8	4.8
9	5.4

P. p.

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
700	84 510	516	522	528	535	541	547	553	559	566
701	572	578	584	590	597	603	609	615	621	628
702	634	640	646	652	658	665	671	677	683	689
703	696	702	708	714	720	726	733	739	745	751
704	757	763	770	776	782	788	794	800	807	813
705	819	825	831	837	844	850	856	862	868	874
706	880	887	893	899	905	911	917	924	930	936
707	942	948	954	960	967	973	979	985	991	997
708	85 003	009	016	022	028	034	040	046	052	058
709	065	071	077	083	089	095	101	107	114	120
710	126	132	138	144	150	156	163	169	175	181
711	187	193	199	205	211	217	224	230	236	242
712	248	254	260	266	272	278	285	291	297	303
713	309	315	321	327	333	339	345	352	358	364
714	370	376	382	388	394	400	406	412	418	425
715	431	437	443	449	455	461	467	473	479	485
716	491	497	503	509	516	522	528	534	540	546
717	552	558	564	570	576	582	588	594	600	606
718	612	618	625	631	637	643	649	655	661	667
719	673	679	685	691	697	703	709	715	721	727
720	733	739	745	751	757	763	769	775	781	788
721	794	800	806	812	818	824	830	836	842	848
722	854	860	866	872	878	884	890	896	902	908
723	914	920	926	932	938	944	950	956	962	968
724	974	980	986	992	998	* 004	* 010	* 016	* 022	* 028
725	86 034	040	046	052	058	064	070	076	082	088
726	094	100	106	112	118	124	130	136	141	147
727	153	159	165	171	177	183	189	195	201	207
728	213	219	225	231	237	243	249	255	261	267
729	273	279	285	291	297	303	308	314	320	326
730	332	338	344	350	356	362	368	374	380	386
731	392	398	404	410	415	421	427	433	439	445
732	451	457	463	469	475	481	487	493	499	504
733	510	516	522	528	534	540	546	552	558	564
734	570	576	581	587	593	599	605	611	617	623
735	629	635	641	646	652	658	664	670	676	682
736	688	694	700	705	711	717	723	729	735	741
737	747	753	759	764	770	776	782	788	794	800
738	806	812	817	823	829	835	841	847	853	859
739	864	870	876	882	888	894	900	906	911	917
740	923	929	935	941	947	953	958	964	970	976
741	982	988	994	999	* 005	* 011	* 017	* 023	* 029	* 035
742	87 040	046	052	058	064	070	075	081	087	093
743	099	105	111	116	122	128	134	140	146	151
744	157	163	169	175	181	186	192	198	204	210
745	216	221	227	233	239	245	251	256	262	268
746	274	280	286	291	297	303	309	315	320	326
747	332	338	344	349	355	361	367	373	379	384
748	390	396	402	408	413	419	425	431	437	442
749	448	454	460	466	471	477	483	489	495	500
750	506	512	518	523	529	535	541	547	552	558
751	564	570	576	581	587	593	599	604	610	616
752	622	628	633	639	645	651	656	662	668	674
753	679	685	691	697	703	708	714	720	726	731
754	737	743	749	754	760	766	772	777	783	789
755	795	800	806	812	818	823	829	835	841	846
756	852	858	864	869	875	881	887	892	898	904
757	910	915	921	927	933	938	944	950	955	961
758	967	973	978	984	990	996	* 001	* 007	* 013	* 018
759	88 024	030	036	041	047	053	058	064	070	076
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	7	6	5
1	0.7	0.6	0.5
2	1.4	1.2	1.0
3	2.1	1.8	1.5
4	2.8	2.4	2.0
5	3.5	3.0	2.5
6	4.2	3.6	3.0
7	4.9	4.2	3.5
8	5.6	4.8	4.0
9	6.3	5.4	4.5

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
760	88 081	087	093	098	104	110	116	121	127	133
761	138	144	150	156	161	167	173	178	184	190
762	195	201	207	213	218	224	230	235	241	247
763	252	258	264	270	275	281	287	292	298	304
764	309	315	321	326	332	338	343	349	355	360
765	366	372	377	383	389	395	400	406	412	417
766	423	429	434	440	446	451	457	463	468	474
767	480	485	491	497	502	508	513	519	525	530
768	536	542	547	553	559	564	570	576	581	587
769	593	598	604	610	615	621	627	632	638	643
770	649	655	660	666	672	677	683	689	694	700
771	705	711	717	722	728	734	739	745	750	756
772	762	767	773	779	784	790	795	801	807	812
773	818	824	829	835	840	846	852	857	863	868
774	874	880	885	891	897	902	908	913	919	925
775	930	936	941	947	953	958	964	969	975	981
776	986	992	997	* 003	* 009	* 014	* 020	* 025	* 031	* 037
777	89 042	048	053	059	064	070	076	081	087	092
778	098	104	109	115	120	126	131	137	143	148
779	154	159	165	170	176	182	187	193	198	204
780	209	215	221	226	232	237	243	248	254	260
781	265	271	276	282	287	293	298	304	310	315
782	321	326	332	337	343	348	354	360	365	371
783	376	382	387	393	398	404	409	415	421	426
784	432	437	443	448	454	459	465	470	476	481
785	487	492	498	504	509	515	520	526	531	537
786	542	548	553	559	564	570	575	581	586	592
787	597	603	609	614	620	625	631	636	642	647
788	653	658	664	669	675	680	686	691	697	702
789	708	713	719	724	730	735	741	746	752	757
790	763	768	774	779	785	790	796	801	807	812
791	818	823	829	834	840	845	851	856	862	867
792	873	878	883	889	894	900	905	911	916	922
793	927	933	938	944	949	955	960	966	971	977
794	982	988	993	998	* 004	* 009	* 015	* 020	* 026	* 031
795	90 037	042	048	053	059	064	069	075	080	086
796	091	097	102	108	113	119	124	129	135	140
797	146	151	157	162	168	173	179	184	189	195
798	200	206	211	217	222	227	233	238	244	249
799	255	260	266	271	276	282	287	293	298	304
800	309	314	320	325	331	336	342	347	352	358
801	363	369	374	380	385	390	396	401	407	412
802	417	423	428	434	439	445	450	455	461	466
803	472	477	482	488	493	499	504	509	515	520
804	526	531	536	542	547	553	558	563	569	574
805	580	585	590	596	601	607	612	617	623	628
806	634	639	644	650	655	660	666	671	677	682
807	687	693	698	703	709	714	720	725	730	736
808	741	747	752	757	763	768	773	779	784	789
809	795	800	806	811	816	822	827	832	838	843
810	849	854	859	865	870	875	881	886	891	897
811	902	907	913	918	924	929	934	940	945	950
812	956	961	966	972	977	982	988	993	998	* 004
813	91 009	014	020	025	030	036	041	046	052	057
814	062	068	073	078	084	089	094	100	105	110
815	116	121	126	132	137	142	148	153	158	164
816	169	174	180	185	190	196	201	206	212	217
817	222	228	233	238	243	249	254	259	265	270
818	275	281	286	291	297	302	307	312	318	323
819	328	334	339	344	350	355	360	365	371	376
N.	0	1	2	3	4	5	6	7	8	9

P. p.

6

1	0.6
2	1.2
3	1.8
4	2.4
5	3.0
6	3.6
7	4.2
8	4.8
9	5.4

5

1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5

Digitized by Google

Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
820	91 381	387	392	397	403	408	413	418	424	429
821	434	440	445	450	455	461	466	471	477	482
822	487	492	498	503	508	514	519	524	529	535
823	540	545	551	556	561	566	572	577	582	587
824	593	598	603	609	614	619	624	630	635	640
825	645	651	656	661	666	672	677	682	687	693
826	698	703	709	714	719	724	730	735	740	745
827	751	756	761	766	772	777	782	787	793	798
828	803	808	814	819	824	829	834	840	845	850
829	855	861	866	871	876	882	887	892	897	903
830	908	913	918	924	929	934	939	944	950	955
831	960	965	971	976	981	986	991	997	* 002	* 007
832	92 012	018	023	028	033	038	044	049	054	059
833	065	070	075	080	085	091	096	101	106	111
834	117	122	127	132	137	143	148	153	158	163
835	169	174	179	184	189	195	200	205	210	215
836	221	226	231	236	241	247	252	257	262	267
837	273	278	283	288	293	298	304	309	314	319
838	324	330	335	340	345	350	355	361	366	371
839	376	381	387	392	397	402	407	412	418	423
840	428	433	438	443	449	454	459	464	469	474
841	480	485	490	495	500	505	511	516	521	526
842	531	536	542	547	552	557	562	567	572	578
843	583	588	593	598	603	609	614	619	624	629
844	634	639	645	650	655	660	665	670	675	681
845	686	691	696	701	706	711	716	722	727	732
846	737	742	747	752	758	763	768	773	778	783
847	788	793	799	804	809	814	819	824	829	834
848	840	845	850	855	860	865	870	875	881	886
849	891	896	901	906	911	916	921	927	932	937
850	942	947	952	957	962	967	973	978	983	988
851	993	998	* 003	* 008	* 013	* 018	* 024	* 029	* 034	* 039
852	93 044	049	054	059	064	069	075	080	085	090
853	095	100	105	110	115	120	125	131	136	141
854	146	151	156	161	166	171	176	181	186	192
855	197	202	207	212	217	222	227	232	237	242
856	247	252	258	263	268	273	278	283	288	293
857	298	303	308	313	318	323	328	334	339	344
858	349	354	359	364	369	374	379	384	389	394
859	399	404	409	414	420	425	430	435	440	445
860	450	455	460	465	470	475	480	485	490	495
861	500	505	510	515	520	526	531	536	541	546
862	551	556	561	566	571	576	581	586	591	596
863	601	606	611	616	621	626	631	636	641	646
864	651	656	661	666	671	676	682	687	692	697
865	702	707	712	717	722	727	732	737	742	747
866	752	757	762	767	772	777	782	787	792	797
867	802	807	812	817	822	827	832	837	842	847
868	852	857	862	867	872	877	882	887	892	897
869	902	907	912	917	922	927	932	937	942	947
870	952	957	962	967	972	977	982	987	992	997
871	94 002	007	012	017	022	027	032	037	042	047
872	052	057	062	067	072	077	082	086	091	096
873	101	106	111	116	121	126	131	136	141	146
874	151	156	161	166	171	176	181	186	191	196
875	201	206	211	216	221	226	231	236	240	245
876	250	255	260	265	270	275	280	285	290	295
877	300	305	310	315	320	325	330	335	340	345
878	349	354	359	364	369	374	379	384	389	394
879	399	404	409	414	419	424	429	433	438	443
N.	0	1	2	3	4	5	6	7	8	9

P. p.

	6	5	4
1	0.6	0.5	0.4
2	1.2	1.0	0.8
3	1.8	1.5	1.2
4	2.4	2.0	1.6
5	3.0	2.5	2.0
6	3.6	3.0	2.4
7	4.2	3.5	2.8
8	4.8	4.0	3.2
9	5.4	4.5	3.6

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
880	94 448	453	458	463	468	473	478	483	488	493
881	498	503	507	512	517	522	527	532	537	542
882	547	552	557	562	567	571	576	581	586	591
883	596	601	606	611	616	621	626	630	635	640
884	645	650	655	660	665	670	675	680	685	689
885	694	699	704	709	714	719	724	729	734	738
886	743	748	753	758	763	768	773	778	783	787
887	792	797	802	807	812	817	822	827	832	836
888	841	846	851	856	861	866	871	876	880	885
889	890	895	900	905	910	915	919	924	929	934
890	939	944	949	954	959	963	968	973	978	983
891	988	993	998	* 002	* 007	* 012	* 017	* 022	* 027	* 032
892	95 036	041	046	051	056	061	066	071	075	080
893	085	090	095	100	105	109	114	119	124	129
894	134	139	143	148	153	158	163	168	173	177
895	182	187	192	197	202	207	211	216	221	226
896	231	236	240	245	250	255	260	265	270	274
897	279	284	289	294	299	303	308	313	318	323
898	328	332	337	342	347	352	357	361	366	371
899	376	381	386	390	395	400	405	410	415	419
900	424	429	434	439	444	448	453	458	463	468
901	472	477	482	487	492	497	501	506	511	516
902	521	525	530	535	540	545	550	554	559	564
903	569	574	578	583	588	593	598	602	607	612
904	617	622	626	631	636	641	646	650	655	660
905	665	670	674	679	684	689	694	698	703	708
906	713	718	722	727	732	737	742	746	751	756
907	761	766	770	775	780	785	789	794	799	804
908	809	813	818	823	828	832	837	842	847	852
909	856	861	866	871	875	880	885	890	895	899
910	904	909	914	918	923	928	933	938	942	947
911	952	957	961	966	971	976	980	985	990	995
912	999	* 004	* 009	* 014	* 019	* 023	* 028	* 033	* 038	* 042
913	96 047	052	057	061	066	071	076	080	085	090
914	095	099	104	109	114	118	123	128	133	137
915	142	147	152	156	161	166	171	175	180	185
916	190	194	199	204	209	213	218	223	227	232
917	237	242	246	251	256	261	265	270	275	280
918	284	289	294	298	303	308	313	317	322	327
919	332	336	341	346	350	355	360	365	369	374
920	379	384	388	393	398	402	407	412	417	421
921	426	431	435	440	445	450	454	459	464	468
922	473	478	483	487	492	497	501	506	511	515
923	520	525	530	534	539	544	548	553	558	562
924	567	572	577	581	586	591	595	600	605	609
925	614	619	624	628	633	638	642	647	652	656
926	661	666	670	675	680	685	689	694	699	703
927	708	713	717	722	727	731	736	741	745	750
928	755	759	764	769	774	778	783	788	792	797
929	802	806	811	816	820	825	830	834	839	844
930	848	853	858	862	867	872	876	881	886	890
931	895	900	904	909	914	918	923	928	932	937
932	942	946	951	956	960	965	970	974	979	984
933	988	993	997	* 002	* 007	* 011	* 016	* 021	* 025	* 030
934	97 035	039	044	049	053	058	063	067	072	077
935	081	086	090	095	100	104	109	114	118	123
936	128	132	137	142	146	151	155	160	165	169
937	174	179	183	188	192	197	202	206	211	216
938	220	225	230	234	239	243	248	253	257	262
939	267	271	276	280	285	290	294	299	304	308
N.	0	1	2	3	4	5	6	7	8	9

P. p.

5

1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5

4

1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4
7	2.8
8	3.2
9	3.6

P. p.

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Logarithmos dos numeros

T. 25)

N.	0	1	2	3	4	5	6	7	8	9
940	97 313	317	322	327	331	336	340	345	350	354
941	359	364	368	373	377	382	387	391	396	400
942	405	410	414	419	424	428	433	437	442	447
943	451	456	460	465	470	474	479	483	488	493
944	497	502	506	511	516	520	525	529	534	539
945	543	548	552	557	562	566	571	575	580	585
946	589	594	598	603	607	612	617	621	626	630
947	635	640	644	649	653	658	663	667	672	676
948	681	685	690	695	699	704	708	713	717	722
949	727	731	736	740	745	749	754	759	763	768
950	772	777	782	786	791	795	800	804	809	813
951	818	823	827	832	836	841	845	850	855	859
952	864	868	873	877	882	886	891	896	900	905
953	909	914	918	923	928	932	937	941	946	950
954	955	959	964	968	973	978	982	987	991	996
955	98 000	005	009	014	019	023	028	032	037	041
956	046	050	055	059	064	068	073	078	082	087
957	091	096	100	105	109	114	118	123	127	132
958	137	141	146	150	155	159	164	168	173	177
959	182	186	191	195	200	204	209	214	218	223
960	227	232	236	241	245	250	254	259	263	268
961	272	277	281	286	290	295	299	304	308	313
962	318	322	327	331	336	340	345	349	354	358
963	363	367	372	376	381	385	390	394	399	403
964	408	412	417	421	426	430	435	439	444	448
965	453	457	462	466	471	475	480	484	489	493
966	498	502	507	511	516	520	525	529	534	538
967	543	547	552	556	561	565	570	574	579	583
968	588	592	597	601	605	610	614	619	623	628
969	632	637	641	646	650	655	659	664	668	673
970	677	682	686	691	695	700	704	709	713	717
971	722	726	731	735	740	744	749	753	758	762
472	767	771	776	780	784	789	793	798	802	807
973	811	816	820	825	829	834	838	843	847	851
974	856	860	865	869	874	878	883	887	892	896
975	900	905	909	914	918	923	927	932	936	941
976	945	949	954	958	963	967	972	976	981	985
977	989	994	998	* 003	* 007	* 012	* 016	* 021	* 025	* 029
978	99 034	038	043	047	052	056	061	065	069	074
979	078	083	087	092	096	100	105	109	114	118
980	123	127	131	136	140	145	149	154	158	162
981	167	171	176	180	185	189	193	198	202	207
982	211	216	220	224	229	233	238	242	247	251
983	255	260	264	269	273	277	282	286	291	295
984	300	304	308	313	317	322	326	330	335	339
985	344	348	352	357	361	366	370	374	379	383
986	388	392	396	401	405	410	414	419	423	427
987	432	436	441	445	449	454	458	463	467	471
988	476	480	484	489	493	498	502	506	511	515
989	520	524	528	533	537	542	546	550	555	559
990	564	568	572	577	581	585	590	594	599	603
991	607	612	616	621	625	629	634	638	642	647
992	651	656	660	664	669	673	677	682	686	691
993	695	699	704	708	712	717	721	726	730	734
994	739	743	747	752	756	760	765	769	774	778
995	782	787	791	795	800	804	808	813	817	822
996	826	830	835	839	843	848	852	856	861	865
997	870	874	878	883	887	891	896	900	904	909
998	913	917	922	926	930	935	939	944	948	952
999	957	961	965	970	974	978	983	987	991	996
N.	0	1	2	3	4	5	6	7	8	9

P. p.

5

1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5

4

1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4
7	2.8
8	3.2
9	3.6

P. p.

Digitized by Google

Logarithmos das linhas trigonometricas

T. 26)

0° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′	P. p.
0	●	— ∞		∞	— ∞		∞	0.00000		10.00000	●●	60	
1	4	6.46373	30103	3.53627	6.46373	30103	3.53627	0.00000		10.00000	56	59	
2	8	6.76476	17609	3.23524	6.76476	17609	3.23524	0.00000		10.00000	52	58	
3	12	6.94085	12494	3.05915	6.94085	12494	3.05915	0.00000		10.00000	48	57	
4	16	7.06579	9691	2.93421	7.06579	9691	2.93421	0.00000		10.00000	44	56	
5	20	7.16270	7918	2.83730	7.16270	7918	2.83730	0.00000		10.00000	40	55	
6	24	7.24188	6694	2.75812	7.24188	6694	2.75812	0.00000		10.00000	36	54	
7	28	7.30882	5800	2.69118	7.30882	5800	2.69118	0.00000		10.00000	32	53	
8	32	7.36682	5115	2.63318	7.36682	5115	2.63318	0.00000		10.00000	28	52	
9	36	7.41797	4576	2.58203	7.41797	4576	2.58203	0.00000		10.00000	24	51	
10	40	7.46373	4139	2.53627	7.46373	4139	2.53627	0.00000		10.00000	20	50	
11	44	7.50512	3779	2.49488	7.50512	3779	2.49488	0.00000		10.00000	16	49	
12	48	7.54291	3476	2.45709	7.54291	3476	2.45709	0.00000		10.00000	12	48	
13	52	7.57767	3218	2.42233	7.57767	3219	2.42233	0.00000		10.00000	8	47	
14	56	7.60985	2997	2.39015	7.60986	2996	2.39014	0.00000		10.00000	4	46	
15	2	7.63982	2802	2.36018	7.63982	2803	2.36018	0.00000		10.00000	59	45	
16	4	7.66784	2633	2.33216	7.66785	2633	2.33215	0.00000		10.00000	56	44	
17	8	7.69417	2483	2.30583	7.69418	2482	2.30582	0.00001		9.99999	52	43	
18	12	7.71900	2348	2.28100	7.71900	2348	2.28100	0.00001		9.99999	48	42	
19	16	7.74248	2227	2.25752	7.74248	2228	2.25752	0.00001		9.99999	44	41	
20	20	7.76475	2119	2.23525	7.76476	2119	2.23524	0.00001		9.99999	40	40	
21	24	7.78594	2021	2.21406	7.78595	2020	2.21405	0.00001		9.99999	36	39	
22	28	7.80615	1930	2.19385	7.80615	1931	2.19385	0.00001		9.99999	32	38	
23	32	7.82545	1848	2.17455	7.82546	1848	2.17454	0.00001		9.99999	28	37	
24	36	7.84393	1773	2.15607	7.84394	1773	2.15606	0.00001		9.99999	24	36	
25	40	7.86166	1704	2.13834	7.86167	1704	2.13833	0.00001		9.99999	20	35	
26	44	7.87870	1639	2.12130	7.87871	1639	2.12129	0.00001		9.99999	16	34	
27	48	7.89509	1579	2.10491	7.89510	1579	2.10490	0.00001		9.99999	12	33	
28	52	7.91088	1524	2.08912	7.91089	1524	2.08911	0.00001		9.99999	8	32	
29	56	7.92612	1472	2.07388	7.92613	1473	2.07387	0.00002		9.99998	4	31	
30	3	7.94084	1424	2.05916	7.94086	1424	2.05914	0.00002		9.99998	58	30	
31	4	7.95508	1379	2.04492	7.95510	1379	2.04490	0.00002		9.99998	56	29	
32	8	7.96887	1336	2.03113	7.96889	1336	2.03111	0.00002		9.99998	52	28	
33	12	7.98223	1297	2.01777	7.98225	1297	2.01775	0.00002		9.99998	48	27	
34	16	7.99520	1259	2.00480	7.99522	1259	2.00478	0.00002		9.99998	44	26	
35	20	8.00779	1223	1.99221	8.00781	1223	1.99219	0.00002		9.99998	40	25	
36	24	8.02002	1190	1.97998	8.02004	1190	1.97996	0.00002		9.99998	36	24	
37	28	8.03192	1158	1.96808	8.03194	1159	1.96806	0.00003		9.99997	32	23	
38	32	8.04350	1128	1.95650	8.04353	1128	1.95647	0.00003		9.99997	28	22	
39	36	8.05478	1100	1.94522	8.05481	1100	1.94519	0.00003		9.99997	24	21	
40	40	8.06578	1072	1.93422	8.06581	1072	1.93419	0.00003		9.99997	20	20	
41	44	8.07650	1046	1.92350	8.07653	1047	1.92347	0.00003		9.99997	16	19	
42	48	8.08696	1022	1.91304	8.08700	1022	1.91300	0.00003		9.99997	12	18	
43	52	8.09718	999	1.90282	8.09722	998	1.90278	0.00003		9.99997	8	17	
44	56	8.10717	976	1.89283	8.10720	976	1.89280	0.00004		9.99996	4	16	
45	8	8.11693	954	1.88307	8.11696	955	1.88304	0.00004		9.99996	57	15	
46	4	8.12647	934	1.87353	8.12651	934	1.87349	0.00004		9.99996	56	14	
47	8	8.13581	914	1.86419	8.13585	915	1.86415	0.00004		9.99996	52	13	
48	12	8.14495	896	1.85505	8.14500	895	1.85500	0.00004		9.99996	48	12	
49	16	8.15391	877	1.84609	8.15395	878	1.84605	0.00004		9.99996	44	11	
50	20	8.16268	860	1.83732	8.16273	860	1.83727	0.00005		9.99995	40	10	
51	24	8.17128	843	1.82872	8.17133	843	1.82867	0.00005		9.99995	36	9	
52	28	8.17971	827	1.82029	8.17976	828	1.82024	0.00005		9.99995	32	8	
53	32	8.18798	812	1.81202	8.18804	812	1.81196	0.00005		9.99995	28	7	
54	36	8.19610	797	1.80390	8.19616	797	1.80384	0.00005		9.99995	24	6	
55	40	8.20407	782	1.79593	8.20413	782	1.79587	0.00006		9.99994	20	5	
56	44	8.21189	769	1.78811	8.21195	769	1.78805	0.00006		9.99994	16	4	
57	48	8.21958	755	1.78042	8.21964	756	1.78036	0.00006		9.99994	12	3	
58	52	8.22713	743	1.77287	8.22720	742	1.77280	0.00006		9.99994	8	2	
59	56	8.23456	730	1.76544	8.23462	730	1.76538	0.00006		9.99994	4	1	
60	4	8.24186		1.75814	8.24192		1.75808	0.00007		9.99993	56	0	
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 89°	P. p.

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Logarithmos das linhas trigonometricas

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4° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′	P. p.
0	4	8.24186	717	1.75814	8.24192	718	1.75808	0.00007		9.99993	58	60	
1	4	8.24903	706	1.75097	8.24910	706	1.75090	0.00007		9.99993	56	59	
2	8	8.25609	695	1.74391	8.25616	696	1.74384	0.00007		9.99993	52	58	
3	12	8.26304	684	1.73696	8.26312	684	1.73688	0.00007		9.99993	48	57	
4	16	8.26988	673	1.73012	8.26996	673	1.73004	0.00008		9.99992	44	56	
5	20	8.27661	663	1.72339	8.27669	663	1.72331	0.00008		9.99992	40	55	
6	24	8.28324	653	1.71676	8.28332	654	1.71668	0.00008		9.99992	36	54	
7	28	8.28977	644	1.71023	8.28986	643	1.71014	0.00008		9.99992	32	53	
8	32	8.29621	634	1.70379	8.29629	634	1.70371	0.00008		9.99992	28	52	
9	36	8.30255	624	1.69745	8.30263	625	1.69737	0.00009		9.99991	24	51	
10	40	8.30879	616	1.69121	8.30888	617	1.69112	0.00009		9.99991	20	50	
11	44	8.31495	608	1.68505	8.31505	607	1.68495	0.00009		9.99991	16	49	
12	48	8.32103	599	1.67897	8.32112	599	1.67888	0.00010		9.99990	12	48	
13	52	8.32702	590	1.67298	8.32711	591	1.67289	0.00010		9.99990	8	47	
14	56	8.33292	583	1.66708	8.33302	584	1.66698	0.00010		9.99990	4	46	
15	5	8.33875	575	1.66125	8.33886	575	1.66114	0.00010		9.99990	55	45	
16	4	8.34450	568	1.65550	8.34461	568	1.65539	0.00011		9.99989	56	44	
17	8	8.35018	560	1.64982	8.35029	561	1.64971	0.00011		9.99989	52	43	
18	12	8.35578	553	1.64422	8.35590	553	1.64410	0.00011		9.99989	48	42	
19	16	8.36131	547	1.63869	8.36143	546	1.63857	0.00011		9.99989	44	41	
20	20	8.36678	539	1.63322	8.36689	540	1.63311	0.00012		9.99988	40	40	
21	24	8.37217	533	1.62783	8.37229	533	1.62771	0.00012		9.99988	36	39	
22	28	8.37750	526	1.62250	8.37762	527	1.62238	0.00012		9.99988	32	38	
23	32	8.38276	520	1.61724	8.38289	520	1.61711	0.00013		9.99987	28	37	
24	36	8.38796	514	1.61204	8.38809	514	1.61191	0.00013		9.99987	24	36	
25	40	8.39310	508	1.60690	8.39323	509	1.60677	0.00013		9.99987	20	35	
26	44	8.39818	502	1.60182	8.39832	502	1.60168	0.00014		9.99986	16	34	
27	48	8.40320	496	1.59680	8.40334	496	1.59666	0.00014		9.99986	12	33	
28	52	8.40816	491	1.59184	8.40830	491	1.59170	0.00014		9.99986	8	32	
29	56	8.41307	485	1.58693	8.41321	486	1.58679	0.00015		9.99985	4	31	
30	6	8.41792	480	1.58208	8.41807	480	1.58193	0.00015		9.99985	54	30	
31	4	8.42272	474	1.57728	8.42287	475	1.57713	0.00015		9.99985	56	29	
32	8	8.42746	470	1.57254	8.42762	470	1.57238	0.00016		9.99984	52	28	
33	12	8.43216	464	1.56784	8.43232	464	1.56768	0.00016		9.99984	48	27	
34	16	8.43680	459	1.56320	8.43696	460	1.56304	0.00016		9.99984	44	26	
35	20	8.44139	455	1.55861	8.44156	455	1.55844	0.00017		9.99983	40	25	
36	24	8.44594	450	1.55406	8.44611	450	1.55389	0.00017		9.99983	36	24	
37	28	8.45044	445	1.54956	8.45061	446	1.54939	0.00017		9.99983	32	23	
38	32	8.45489	441	1.54511	8.45507	441	1.54493	0.00018		9.99982	28	22	
39	36	8.45930	436	1.54070	8.45948	437	1.54052	0.00018		9.99982	24	21	
40	40	8.46366	433	1.53634	8.46385	432	1.53615	0.00018		9.99982	20	20	
41	44	8.46799	427	1.53201	8.46817	428	1.53183	0.00019		9.99981	16	19	
42	48	8.47226	424	1.52774	8.47245	424	1.52755	0.00019		9.99981	12	18	
43	52	8.47650	419	1.52350	8.47669	420	1.52331	0.00019		9.99981	8	17	
44	56	8.48069	416	1.51931	8.48089	416	1.51911	0.00020		9.99980	4	16	
45	7	8.48485	411	1.51515	8.48505	412	1.51495	0.00020		9.99980	53	15	
46	4	8.48896	408	1.51104	8.48917	408	1.51083	0.00021		9.99979	56	14	
47	8	8.49304	404	1.50696	8.49325	404	1.50675	0.00021		9.99979	52	13	
48	12	8.49708	400	1.50292	8.49729	401	1.50271	0.00021		9.99979	48	12	
49	16	8.50108	396	1.49892	8.50130	397	1.49870	0.00022		9.99978	44	11	
50	20	8.50504	393	1.49496	8.50527	393	1.49473	0.00022		9.99978	40	10	
51	24	8.50897	390	1.49103	8.50920	390	1.49080	0.00023		9.99977	36	9	
52	28	8.51287	386	1.48713	8.51310	386	1.48660	0.00023		9.99977	32	8	
53	32	8.51673	382	1.48327	8.51696	383	1.48304	0.00023		9.99977	28	7	
54	36	8.52055	379	1.47945	8.52079	380	1.47921	0.00024		9.99976	24	6	
55	40	8.52434	376	1.47566	8.52459	376	1.47541	0.00024		9.99976	20	5	
56	44	8.52810	373	1.47190	8.52835	373	1.47165	0.00025		9.99975	16	4	
57	48	8.53183	369	1.46817	8.53208	370	1.46792	0.00025		9.99975	12	3	
58	52	8.53552	367	1.46448	8.53578	367	1.46422	0.00026		9.99974	8	2	
59	56	8.53919	363	1.46081	8.53945	363	1.46055	0.00026		9.99974	4	1	
60	8	8.54282		1.45718	8.54308		1.45692	0.00026		9.99974	52	0	
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 88°	P. p.

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Logarithmos das linhas trigonometricas

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2° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′	P. p.
0	0	8.54282	360	1.45718	8.54308	361	1.45692	0.00026		9.99974	52	60	
1	4	8.54642	357	1.45358	8.54669	358	1.45331	0.00027		9.99973	56	59	
2	8	8.54999	355	1.45001	8.55027	355	1.44973	0.00027		9.99973	52	58	
3	12	8.55354	351	1.44646	8.55382	352	1.44618	0.00028		9.99972	48	57	
4	16	8.55705	349	1.44295	8.55734	349	1.44266	0.00028		9.99972	44	56	
5	20	8.56054	346	1.43946	8.56083	346	1.43917	0.00029		9.99971	40	55	
6	24	8.56400	343	1.43600	8.56429	344	1.43571	0.00029		9.99971	36	54	
7	28	8.56743	341	1.43257	8.56773	341	1.43227	0.00030		9.99970	32	53	
8	32	8.57084	337	1.42916	8.57114	338	1.42886	0.00030		9.99970	28	52	
9	36	8.57421	336	1.42579	8.57452	336	1.42548	0.00031		9.99969	24	51	
10	40	8.57757	332	1.42243	8.57788	333	1.42212	0.00031		9.99969	20	50	
11	44	8.58089	330	1.41911	8.58121	330	1.41879	0.00032		9.99968	16	49	
12	48	8.58419	328	1.41581	8.58451	328	1.41549	0.00032		9.99968	12	48	
13	52	8.58747	325	1.41253	8.58779	326	1.41221	0.00033		9.99967	8	47	
14	56	8.59072	323	1.40928	8.59105	323	1.40895	0.00033		9.99967	4	46	
15	0	8.59395	320	1.40605	8.59428	321	1.40572	0.00033		9.99967	51	45	
16	4	8.59715	318	1.40285	8.59749	319	1.40251	0.00034		9.99966	56	44	
17	8	8.60033	316	1.39967	8.60068	316	1.39932	0.00034		9.99966	52	43	
18	12	8.60349	313	1.39651	8.60384	314	1.39616	0.00035		9.99965	48	42	
19	16	8.60662	311	1.39338	8.60698	311	1.39302	0.00036		9.99964	44	41	
20	20	8.60973	309	1.39027	8.61009	310	1.38991	0.00036		9.99964	40	40	
21	24	8.61282	307	1.38718	8.61319	307	1.38681	0.00037		9.99963	36	39	
22	28	8.61589	305	1.38411	8.61626	305	1.38374	0.00037		9.99963	32	38	
23	32	8.61894	302	1.38106	8.61931	303	1.38069	0.00038		9.99962	28	37	
24	36	8.62196	301	1.37804	8.62234	301	1.37766	0.00038		9.99962	24	36	
25	40	8.62497	298	1.37503	8.62535	299	1.37465	0.00039		9.99961	20	35	
26	44	8.62795	296	1.37205	8.62834	297	1.37166	0.00039		9.99961	16	34	
27	48	8.63091	294	1.36909	8.63131	295	1.36869	0.00040		9.99960	12	33	
28	52	8.63385	293	1.36615	8.63426	292	1.36574	0.00040		9.99960	8	32	
29	56	8.63678	290	1.36322	8.63718	291	1.36282	0.00041		9.99959	4	31	
30	10	8.63968	288	1.36032	8.64009	289	1.35991	0.00041		9.99959	50	30	
31	4	8.64256	287	1.35744	8.64298	287	1.35702	0.00042		9.99958	56	29	
32	8	8.64543	284	1.35457	8.64585	285	1.35415	0.00042		9.99958	52	28	
33	12	8.64827	283	1.35173	8.64870	284	1.35130	0.00043		9.99957	48	27	
34	16	8.65110	281	1.34890	8.65154	281	1.34846	0.00044		9.99956	44	26	
35	20	8.65391	279	1.34609	8.65435	280	1.34565	0.00044		9.99956	40	25	
36	24	8.65670	277	1.34330	8.65715	278	1.34285	0.00045		9.99955	36	24	
37	28	8.65947	276	1.34053	8.65993	276	1.34007	0.00045		9.99955	32	23	
38	32	8.66223	274	1.33777	8.66269	274	1.33731	0.00046		9.99954	28	22	
39	36	8.66497	272	1.33503	8.66543	273	1.33457	0.00046		9.99954	24	21	
40	40	8.66769	270	1.33231	8.66816	271	1.33184	0.00047		9.99953	20	20	
41	44	8.67039	269	1.32961	8.67087	269	1.32913	0.00048		9.99952	16	19	
42	48	8.67308	267	1.32692	8.67356	268	1.32644	0.00048		9.99952	12	18	
43	52	8.67575	266	1.32425	8.67624	266	1.32376	0.00049		9.99951	8	17	
44	56	8.67841	263	1.32159	8.67890	264	1.32110	0.00049		9.99951	4	16	
45	11	8.68104	263	1.31896	8.68154	263	1.31846	0.00050		9.99950	49	15	
46	4	8.68367	260	1.31633	8.68417	261	1.31583	0.00051		9.99949	56	14	
47	8	8.68627	259	1.31373	8.68678	260	1.31322	0.00051		9.99949	52	13	
48	12	8.68886	258	1.31114	8.68938	258	1.31062	0.00052		9.99948	48	12	
49	16	8.69144	256	1.30856	8.69196	257	1.30804	0.00052		9.99948	44	11	
50	20	8.69400	254	1.30600	8.69453	255	1.30547	0.00053		9.99947	40	10	
51	24	8.69654	253	1.30346	8.69708	254	1.30292	0.00054		9.99946	36	9	
52	28	8.69907	252	1.30093	8.69962	252	1.30038	0.00054		9.99946	32	8	
53	32	8.70159	250	1.29841	8.70214	251	1.29786	0.00055		9.99945	28	7	
54	36	8.70409	249	1.29591	8.70465	249	1.29535	0.00056		9.99944	24	6	
55	40	8.70658	247	1.29342	8.70714	248	1.29286	0.00056		9.99944	20	5	
56	44	8.70905	246	1.29095	8.70962	246	1.29038	0.00057		9.99943	16	4	
57	48	8.71151	244	1.28849	8.71208	245	1.28792	0.00058		9.99942	12	3	
58	52	8.71395	243	1.28605	8.71453	244	1.28547	0.00058		9.99942	8	2	
59	56	8.71638	242	1.28362	8.71697	243	1.28303	0.00059		9.99941	4	1	
60	12	8.71880		1.28120	8.71940		1.28060	0.00060		9.99940	48	0	
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 87°	P. p.

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Logarithmos das linhas trigonometricas

3° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	12	8.71880	240	1.28120	8.71940	241	1.28060	0.00060		9.99940	48	60
1	4	8.72120	239	1.27880	8.72181	239	1.27819	0.00060		9.99940	56	59
2	8	8.72359	238	1.27641	8.72420	239	1.27580	0.00061		9.99939	52	58
3	12	8.72597	237	1.27403	8.72659	237	1.27341	0.00062		9.99938	48	57
4	16	8.72834	235	1.27166	8.72896	236	1.27104	0.00062		9.99938	44	56
5	20	8.73069	234	1.26931	8.73132	234	1.26868	0.00063		9.99937	40	55
6	24	8.73303	232	1.26697	8.73366	234	1.26634	0.00064		9.99936	36	54
7	28	8.73535	232	1.26465	8.73600	232	1.26400	0.00064		9.99936	32	53
8	32	8.73767	230	1.26233	8.73832	231	1.26168	0.00065		9.99935	28	52
9	36	8.73997	229	1.26003	8.74063	229	1.25937	0.00066		9.99934	24	51
10	40	8.74226	228	1.25774	8.74292	229	1.25708	0.00066		9.99934	20	50
11	44	8.74454	226	1.25546	8.74521	227	1.25479	0.00067		9.99933	16	49
12	48	8.74680	226	1.25320	8.74748	226	1.25252	0.00068		9.99932	12	48
13	52	8.74906	224	1.25094	8.74974	225	1.25026	0.00068		9.99932	8	47
14	56	8.75130	223	1.24870	8.75199	224	1.24801	0.00069		9.99931	4	46
15	12	8.75353	222	1.24647	8.75423	222	1.24577	0.00070		9.99930	47	45
16	4	8.75575	220	1.24425	8.75645	222	1.24355	0.00071		9.99929	56	44
17	8	8.75795	220	1.24205	8.75867	220	1.24133	0.00071		9.99929	52	43
18	12	8.76015	219	1.23985	8.76087	219	1.23913	0.00072		9.99928	48	42
19	16	8.76234	217	1.23766	8.76306	219	1.23694	0.00073		9.99927	44	41
20	20	8.76451	216	1.23549	8.76525	217	1.23475	0.00074		9.99926	40	40
21	24	8.76667	216	1.23333	8.76742	216	1.23258	0.00074		9.99926	36	39
22	28	8.76883	214	1.23117	8.76958	215	1.23042	0.00075		9.99925	32	38
23	32	8.77097	213	1.22903	8.77173	214	1.22827	0.00076		9.99924	28	37
24	36	8.77310	212	1.22690	8.77387	213	1.22613	0.00077		9.99923	24	36
25	40	8.77522	211	1.22478	8.77600	211	1.22400	0.00077		9.99923	20	35
26	44	8.77733	210	1.22267	8.77811	211	1.22189	0.00078		9.99922	16	34
27	48	8.77943	209	1.22057	8.78022	210	1.21978	0.00079		9.99921	12	33
28	52	8.78152	208	1.21848	8.78232	209	1.21768	0.00080		9.99920	8	32
29	56	8.78360	208	1.21640	8.78441	208	1.21559	0.00080		9.99920	4	31
30	14	8.78568	206	1.21432	8.78649	206	1.21351	0.00081		9.99919	46	30
31	4	8.78774	205	1.21226	8.78855	206	1.21145	0.00082		9.99918	56	29
32	8	8.78979	204	1.21021	8.79061	205	1.20939	0.00083		9.99917	52	28
33	12	8.79183	203	1.20817	8.79266	204	1.20734	0.00083		9.99917	48	27
34	16	8.79386	202	1.20614	8.79470	203	1.20530	0.00084		9.99916	44	26
35	20	8.79588	201	1.20412	8.79673	202	1.20327	0.00085		9.99915	40	25
36	24	8.79789	201	1.20211	8.79875	201	1.20125	0.00086		9.99914	36	24
37	28	8.79990	199	1.20010	8.80076	201	1.19924	0.00087		9.99913	32	23
38	32	8.80189	199	1.19811	8.80277	199	1.19723	0.00087		9.99913	28	22
39	36	8.80388	197	1.19612	8.80476	198	1.19524	0.00088		9.99912	24	21
40	40	8.80585	197	1.19415	8.80674	198	1.19326	0.00089		9.99911	20	20
41	44	8.80782	196	1.19218	8.80872	196	1.19128	0.00090		9.99910	16	19
42	48	8.80978	195	1.19022	8.81068	196	1.18932	0.00091		9.99909	12	18
43	52	8.81173	194	1.18827	8.81264	195	1.18736	0.00091		9.99909	8	17
44	56	8.81367	193	1.18633	8.81459	194	1.18541	0.00092		9.99908	4	16
45	15	8.81560	192	1.18440	8.81653	193	1.18347	0.00093		0.99907	45	15
46	4	8.81752	192	1.18248	8.81846	192	1.18154	0.00094		0.99906	56	14
47	8	8.81944	190	1.18056	8.82038	192	1.17962	0.00095		0.99905	52	13
48	12	8.82134	190	1.17866	8.82230	190	1.17770	0.00096		0.99904	48	12
49	16	8.82324	189	1.17676	8.82420	190	1.17580	0.00096		0.99904	44	11
50	20	8.82513	188	1.17487	8.82610	189	1.17390	0.00097		9.99903	40	10
51	24	8.82701	187	1.17299	8.82799	188	1.17201	0.00098		9.99902	36	9
52	28	8.82888	187	1.17112	8.82987	188	1.17013	0.00099		9.99901	32	8
53	32	8.83075	186	1.16925	8.83175	186	1.16825	0.00100		9.99900	28	7
54	36	8.83261	185	1.16739	8.83361	186	1.16639	0.00101		9.99899	24	6
55	40	8.83446	184	1.16554	8.83547	185	1.16453	0.00102		9.99898	20	5
56	44	8.83630	183	1.16370	8.83732	184	1.16268	0.00102		9.99898	16	4
57	48	8.83813	183	1.16187	8.83916	184	1.16084	0.00103		9.99897	12	3
58	52	8.83996	181	1.16004	8.84100	182	1.15900	0.00104		9.99896	8	2
59	56	8.84177	181	1.15823	8.84282	182	1.15718	0.00105		9.99895	4	1
60	10	8.84358		1.15642	8.84464		1.15536	0.00106		9.99894	44	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 86°

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″	241	239	2
10	40	40	4
20	80	80	7
30	121	120	11
40	161	159	15
50	201	199	19
6	24	24	2
7	28	28	2
8	32	32	3
9	36	36	3
″	234	232	22
10	39	39	3
20	78	77	7
30	117	116	11
40	156	155	15
50	195	193	19
6	23	23	2
7	27	27	2
8	31	31	3
9	35	35	3
″	226	224	22
10	38	37	3
20	75	75	7
30	113	112	11
40	151	149	14
50	188	187	18
6	23	22	2
7	26	26	2
8	30	30	3
9	34	34	3
″	219	216	21
10	37	36	3
20	73	72	7
30	110	108	10
40	146	144	14
50	183	180	17
6	22	22	2
7	26	25	2
8	29	29	2
9	33	32	3
″	211	208	20
10	35	35	3
20	70	69	6
30	106	104	10
40	141	139	13
50	176	173	17
6	21	21	2
7	25	24	2
8	28	28	2
9	32	31	3
″	204	201	19
10	34	34	3
20	68	67	6
30	102	101	10
40	136	134	13
50	170	168	16
6	20	20	2
7	24	23	2
8	27	27	2
9	31	30	3
″	196	193	19
10	33	32	3
20	65	64	6
30	98	97	9
40	131	129	12
50	163	161	16
6	20	19	1
7	23	23	2
8	26	26	2
9	29	29	2
″	187	184	18
10	31	31	3
20	62	61	6
30	94	92	9
40	125	123	12
50	156	153	15
6	19	18	1
7	22	21	2
8	25	25	2
9	28	28	2

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T. 26)

Logarithmos das linhas trigonometricas

4° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	00	8.84358	181	1.15642	8.84464	182	1.15536	0.00106		9.99894	44	60
1	4	8.84539	179	1.15461	8.84646	180	1.15354	0.00107		9.99893	56	59
2	8	8.84718	179	1.15282	8.84826	180	1.15174	0.00108		9.99892	52	58
3	12	8.84897	178	1.15103	8.85006	179	1.14994	0.00109		9.99891	48	57
4	16	8.85075	177	1.14925	8.85185	178	1.14815	0.00109		9.99891	44	56
5	20	8.85252	177	1.14748	8.85363	177	1.14637	0.00110		9.99890	40	55
6	24	8.85429	176	1.14571	8.85540	177	1.14460	0.00111		9.99889	36	54
7	28	8.85605	175	1.14395	8.85717	176	1.14283	0.00112		9.99888	32	53
8	32	8.85780	175	1.14220	8.85893	176	1.14107	0.00113		9.99887	28	52
9	36	8.85955	173	1.14045	8.86069	174	1.13931	0.00114		9.99886	24	51
10	40	8.86128	173	1.13872	8.86243	174	1.13757	0.00115		9.99885	20	50
11	44	8.86301	173	1.13699	8.86417	174	1.13583	0.00116		9.99884	16	49
12	48	8.86474	171	1.13526	8.86591	172	1.13409	0.00117		9.99883	12	48
13	52	8.86645	171	1.13355	8.86763	172	1.13237	0.00118		9.99882	8	47
14	56	8.86816	171	1.13184	8.86935	171	1.13065	0.00119		9.99881	4	46
15	00	8.86987	169	1.13013	8.87106	171	1.12894	0.00120		9.99880	48	45
16	4	8.87156	169	1.12844	8.87277	170	1.12723	0.00121		9.99879	56	44
17	8	8.87325	169	1.12675	8.87447	169	1.12553	0.00121		9.99879	52	43
18	12	8.87494	168	1.12506	8.87616	169	1.12384	0.00122		9.99878	48	42
19	16	8.87662	167	1.12339	8.87785	168	1.12215	0.00123		9.99877	44	41
20	20	8.87829	166	1.12171	8.87953	167	1.12047	0.00124		9.99876	40	40
21	24	8.87995	166	1.12005	8.88120	167	1.11880	0.00125		9.99875	36	39
22	28	8.88161	165	1.11839	8.88287	166	1.11713	0.00126		9.99874	32	38
23	32	8.88326	164	1.11674	8.88453	165	1.11547	0.00127		9.99873	28	37
24	36	8.88490	164	1.11510	8.88618	165	1.11382	0.00128		9.99872	24	36
25	40	8.88654	163	1.11346	8.88783	165	1.11217	0.00129		9.99871	20	35
26	44	8.88817	163	1.11183	8.88948	163	1.11052	0.00130		9.99870	16	34
27	48	8.88980	162	1.11020	8.89111	163	1.10889	0.00131		9.99869	12	33
28	52	8.89142	162	1.10858	8.89274	163	1.10726	0.00132		9.99868	8	32
29	56	8.89304	160	1.10696	8.89437	161	1.10563	0.00133		9.99867	4	31
30	00	8.89464	161	1.10536	8.89598	162	1.10402	0.00134		9.99866	48	30
31	4	8.89625	159	1.10375	8.89760	160	1.10240	0.00135		9.99865	56	29
32	8	8.89784	159	1.10216	8.89920	160	1.10080	0.00136		9.99864	52	28
33	12	8.89943	159	1.10057	8.90080	160	1.09920	0.00137		9.99863	48	27
34	16	8.90102	158	1.09898	8.90240	159	1.09760	0.00138		9.99862	44	26
35	20	8.90260	157	1.09740	8.90399	158	1.09601	0.00139		9.99861	40	25
36	24	8.90417	157	1.09583	8.90557	158	1.09443	0.00140		9.99860	36	24
37	28	8.90574	156	1.09426	8.90715	157	1.09285	0.00141		9.99859	32	23
38	32	8.90730	155	1.09270	8.90872	157	1.09128	0.00142		9.99858	28	22
39	36	8.90885	155	1.09115	8.91029	156	1.08971	0.00143		9.99857	24	21
40	40	8.91040	155	1.08960	8.91185	155	1.08815	0.00144		9.99856	20	20
41	44	8.91195	154	1.08805	8.91340	155	1.08660	0.00145		9.99855	16	19
42	48	8.91349	153	1.08651	8.91495	155	1.08505	0.00146		9.99854	12	18
43	52	8.91502	153	1.08498	8.91650	154	1.08350	0.00147		9.99853	8	17
44	56	8.91655	152	1.08345	8.91804	153	1.08197	0.00148		9.99852	4	16
45	00	8.91807	152	1.08193	8.91957	153	1.08043	0.00149		9.99851	44	15
46	4	8.91959	151	1.08041	8.92110	152	1.07890	0.00150		9.99850	56	14
47	8	8.92110	151	1.07890	8.92262	152	1.07738	0.00152		9.99848	52	13
48	12	8.92261	150	1.07739	8.92414	151	1.07586	0.00153		9.99847	48	12
49	16	8.92411	150	1.07589	8.92565	151	1.07435	0.00154		9.99846	44	11
50	20	8.92561	149	1.07439	8.92716	150	1.07284	0.00155		9.99845	40	10
51	24	8.92710	149	1.07290	8.92866	150	1.07134	0.00156		9.99844	36	9
52	28	8.92859	148	1.07141	8.93016	149	1.06984	0.00157		9.99843	32	8
53	32	8.93007	147	1.06993	8.93165	149	1.06835	0.00158		9.99842	28	7
54	36	8.93154	147	1.06846	8.93314	148	1.06687	0.00159		9.99841	24	6
55	40	8.93301	147	1.06699	8.93462	147	1.06538	0.00160		9.99840	20	5
56	44	8.93448	146	1.06552	8.93609	147	1.06391	0.00161		9.99839	16	4
57	48	8.93594	146	1.06406	8.93756	147	1.06244	0.00162		9.99838	12	3
58	52	8.93740	145	1.06260	8.93903	146	1.06097	0.00163		9.99837	8	2
59	56	8.93885	145	1.06115	8.94049	146	1.05951	0.00164		9.99836	4	1
60	00	8.94030		1.05970	8.94195		1.05805	0.00166		9.99834	40	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 85°

P. p.

″	181	179	177
10	30	30	30
20	60	60	59
30	91	90	89
40	121	119	118
50	151	149	148
6	18	18	18
7	21	21	21
8	24	24	24
9	27	27	27
″	175	173	171
10	29	29	29
20	58	58	57
30	88	87	86
40	117	115	114
50	146	144	143
6	18	17	17
7	20	20	20
8	23	23	23
9	26	26	26
″	169	167	165
10	28	28	28
20	56	56	55
30	85	84	83
40	113	111	110
50	141	139	138
6	17	17	17
7	20	19	19
8	23	22	22
9	25	25	25
″	163	162	160
10	27	27	27
20	54	54	53
30	82	81	80
40	109	108	107
50	136	135	133
6	16	16	16
7	19	19	19
8	22	22	21
9	24	24	24
″	159	158	157
10	27	26	26
20	53	53	52
30	80	79	79
40	106	105	105
50	133	132	131
6	16	16	16
7	19	18	18
8	21	21	21
9	24	24	24
″	155	153	152
10	26	26	25
20	52	51	51
30	78	77	76
40	103	102	101
50	129	128	127
6	16	15	15
7	18	18	18
8	21	20	20
9	23	23	23
″	151	150	149
10	25	25	25
20	50	50	50
30	76	75	75
40	101	100	99
50	126	125	124
6	15	15	15
7	18	18	17
8	20	20	20
9	23	23	22
″	147	146	145
10	25	24	24
20	49	49	48
30	74	73	73
40	98	97	97
50	123	122	121
6	15	15	15
7	17	17	17
8	20	19	19
9	22	22	22

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Logarithmos das linhas trigonometricas

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5° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	20	8.94030	144	1.05970	8.94195	145	1.05805	0.00166		9.99834	40	60
1	4	8.94174	143	1.05826	8.94340	145	1.05660	0.00167		9.99833	56	59
2	8	8.94317	144	1.05683	8.94485	145	1.05515	0.00168		9.99832	52	58
3	12	8.94461	142	1.05539	8.94630	143	1.05370	0.00169		9.99831	48	57
4	16	8.94603	143	1.05397	8.94773	144	1.05227	0.00170		9.99830	44	56
5	20	8.94746	141	1.05254	8.94917	143	1.05083	0.00171		9.99829	40	55
6	24	8.94887	142	1.05113	8.95060	142	1.04940	0.00172		9.99828	36	54
7	28	8.95029	141	1.04971	8.95202	142	1.04798	0.00173		9.99827	32	53
8	32	8.95170	140	1.04830	8.95344	142	1.04656	0.00175		9.99825	28	52
9	36	8.95310	140	1.04690	8.95486	141	1.04514	0.00176		9.99824	24	51
10	40	8.95450	139	1.04550	8.95627	140	1.04373	0.00177		9.99823	20	50
11	44	8.95589	139	1.04411	8.95767	141	1.04233	0.00178		9.99822	16	49
12	48	8.95728	139	1.04272	8.95908	139	1.04092	0.00179		9.99821	12	48
13	52	8.95867	138	1.04133	8.96047	140	1.03953	0.00180		9.99820	8	47
14	56	8.96005	138	1.03995	8.96187	138	1.03813	0.00181		9.99819	4	46
15	21	8.96143	137	1.03857	8.96325	139	1.03675	0.00183		9.99817	20	45
16	4	8.96280	137	1.03720	8.96464	138	1.03536	0.00184		9.99816	56	44
17	8	8.96417	136	1.03583	8.96602	137	1.03398	0.00185		9.99815	52	43
18	12	8.96553	136	1.03447	8.96739	138	1.03261	0.00186		9.99814	48	42
19	16	8.96689	136	1.03311	8.96877	136	1.03123	0.00187		9.99813	44	41
20	20	8.96825	135	1.03175	8.97013	137	1.02987	0.00188		9.99812	40	40
21	24	8.96960	135	1.03040	8.97150	135	1.02850	0.00190		9.99810	36	39
22	28	8.97095	134	1.02905	8.97285	136	1.02715	0.00191		9.99809	32	38
23	32	8.97229	134	1.02771	8.97421	135	1.02579	0.00192		9.99808	28	37
24	36	8.97363	133	1.02637	8.97556	135	1.02444	0.00193		9.99807	24	36
25	40	8.97496	133	1.02504	8.97691	134	1.02309	0.00194		0.99806	20	35
26	44	8.97629	133	1.02371	8.97825	134	1.02175	0.00196		9.99804	16	34
27	48	8.97762	132	1.02238	8.97959	133	1.02041	0.00197		9.99803	12	33
28	52	8.97894	132	1.02106	8.98092	133	1.01908	0.00198		9.99802	8	32
29	56	8.98026	131	1.01974	8.98225	133	1.01775	0.00199		9.99801	4	31
30	22	8.98157	131	1.01843	8.98358	132	1.01642	0.00200		9.99800	24	30
31	4	8.98288	131	1.01712	8.98490	132	1.01510	0.00202		9.99798	56	29
32	8	8.98419	130	1.01581	8.98622	131	1.01378	0.00203		9.99797	52	28
33	12	8.98549	130	1.01451	8.98753	131	1.01247	0.00204		9.99796	48	27
34	16	8.98679	129	1.01321	8.98884	131	1.01116	0.00205		9.99795	44	26
35	20	8.98808	129	1.01192	8.99015	130	1.00985	0.00207		9.99793	40	25
36	24	8.98937	129	1.01063	8.99145	130	1.00855	0.00208		9.99792	36	24
37	28	8.99066	128	1.00934	8.99275	130	1.00725	0.00209		9.99791	32	23
38	32	8.99194	128	1.00806	8.99405	129	1.00595	0.00210		9.99790	28	22
39	36	8.99322	128	1.00678	8.99534	128	1.00466	0.00212		9.99788	24	21
40	40	8.99450	127	1.00550	8.99662	129	1.00338	0.00213		9.99787	20	20
41	44	8.99577	127	1.00423	8.99791	128	1.00209	0.00214		9.99786	16	19
42	48	8.99704	126	1.00296	8.99919	127	1.00081	0.00215		9.99785	12	18
43	52	8.99830	126	1.00170	9.00046	128	0.99954	0.00217		9.99783	8	17
44	56	8.99956	126	1.00044	9.00174	127	0.99826	0.00218		9.99782	4	16
45	23	9.00082	125	0.99918	9.00301	126	0.99699	0.00219		9.99781	23	15
46	4	9.00207	125	0.99793	9.00427	126	0.99573	0.00220		9.99780	56	14
47	8	9.00332	124	0.99668	9.00553	126	0.99447	0.00222		9.99778	52	13
48	12	9.00456	125	0.99544	9.00679	126	0.99321	0.00223		9.99777	48	12
49	16	9.00581	123	0.99419	9.00805	125	0.99195	0.00224		9.99776	44	11
50	20	9.00704	124	0.99296	9.00930	125	0.99070	0.00225		9.99775	40	10
51	24	9.00828	123	0.99172	9.01055	124	0.98945	0.00227		9.99773	36	9
52	28	9.00951	123	0.99049	9.01179	124	0.98821	0.00228		9.99772	32	8
53	32	9.01074	122	0.98926	9.01303	124	0.98697	0.00229		9.99771	28	7
54	36	9.01196	122	0.98804	9.01427	123	0.98573	0.00231		9.99769	24	6
55	40	9.01318	122	0.98682	9.01550	123	0.98450	0.00232		9.99768	20	5
56	44	9.01440	121	0.98560	9.01673	123	0.98327	0.00233		9.99767	16	4
57	48	9.01561	121	0.98439	9.01796	122	0.98204	0.00235		9.99765	12	3
58	52	9.01682	121	0.98318	9.01918	122	0.98082	0.00236		9.99764	8	2
59	56	9.01803	120	0.98197	9.02040	122	0.97960	0.00237		9.99763	4	1
60	24	9.01923		0.98077	9.02162		0.97838	0.00239		9.99761	26	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 84°

P. p.

″	145	144	143
10	24	24	24
20	48	48	47
30	73	72	71
40	97	96	95
50	121	120	119
6	15	14	14
7	17	17	17
8	19	19	19
9	22	22	21
″	141	140	139
10	24	23	23
20	47	47	46
30	71	70	69
40	94	93	92
50	118	117	116
6	14	14	14
7	16	16	16
8	19	19	19
9	21	21	21
″	138	137	136
10	23	23	23
20	46	46	45
30	69	69	68
40	92	91	91
50	115	114	113
6	14	14	14
7	16	16	16
8	18	18	18
9	21	21	20
″	135	34	133
10	23	22	22
20	45	45	44
30	68	67	67
40	90	89	89
50	113	112	111
6	14	13	13
7	16	16	16
8	18	18	18
9	20	20	20
″	132	131	130
10	22	22	22
20	44	44	43
30	66	66	65
40	88	87	87
50	110	109	108
6	13	13	13
7	15	15	15
8	18	17	17
9	20	20	20
″	129	128	127
10	22	21	21
20	43	43	42
30	65	64	64
40	86	85	85
50	108	107	106
6	13	13	13
7	15	15	15
8	17	17	17
9	19	19	19
″	126	125	124
10	21	21	21
20	42	42	41
30	63	63	62
40	84	83	83
50	105	104	103
6	13	13	12
7	15	15	14
8	17	17	17
9	19	19	19

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T. 26)

6° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	24	9.01923	120	0.98077	9.02162	121	0.97838	0.00239		9.99761	36	60
1	4	9.02043	120	0.97957	9.02283	121	0.97717	0.00240		9.99760	56	59
2	8	9.02163	120	0.97837	9.02404	121	0.97596	0.00241		9.99759	52	58
3	12	9.02283	119	0.97717	9.02525	120	0.97475	0.00243		9.99757	48	57
4	16	9.02402	118	0.97598	9.02645	121	0.97355	0.00244		9.99756	44	56
5	20	9.02520	119	0.97480	9.02766	119	0.97234	0.00245		9.99755	40	55
6	24	9.02639	118	0.97361	9.02885	120	0.97115	0.00247		9.99753	36	54
7	28	9.02757	117	0.97243	9.03005	119	0.96995	0.00248		9.99752	32	53
8	32	9.02874	118	0.97126	9.03124	118	0.96876	0.00249		9.99751	28	52
9	36	9.02992	117	0.97008	9.03242	119	0.96758	0.00251		9.99749	24	51
10	40	9.03109	117	0.96891	9.03361	118	0.96639	0.00252		9.99748	20	50
11	44	9.03226	116	0.96774	9.03479	118	0.96521	0.00253		9.99747	16	49
12	48	9.03342	116	0.96658	9.03597	117	0.96403	0.00255		9.99745	12	48
13	52	9.03458	116	0.96542	9.03714	118	0.96286	0.00256		9.99744	8	47
14	56	9.03574	116	0.96426	9.03832	116	0.96168	0.00258		9.99742	4	46
15	28	9.03690	115	0.96310	9.03948	117	0.96052	0.00259		9.99741	28	45
16	4	9.03805	115	0.96195	9.04065	116	0.95935	0.00260		9.99740	56	44
17	8	9.03920	114	9.96080	9.04181	116	0.95819	0.00262		9.99738	52	43
18	12	9.04034	115	0.95966	9.04297	116	0.95703	0.00263		9.99737	48	42
19	16	9.04149	113	0.95851	9.04413	115	0.95587	0.00264		9.99736	44	41
20	20	9.04262	114	0.95738	9.04528	115	0.95472	0.00266		9.99734	40	40
21	24	9.04376	114	0.95624	9.04643	115	0.95357	0.00267		9.99733	36	39
22	28	9.04490	113	0.95510	9.04758	115	0.95242	0.00269		9.99731	32	38
23	32	9.04603	112	0.95397	9.04873	114	0.95127	0.00270		9.99730	28	37
24	36	9.04715	113	0.95285	9.04987	114	0.95013	0.00272		9.99728	24	36
25	40	9.04828	112	0.95172	9.05101	113	0.94899	0.00273		9.99727	20	35
26	44	9.04940	112	0.95060	9.05214	114	0.94786	0.00274		9.99726	16	34
27	48	9.05052	112	0.94948	9.05328	113	0.94672	0.00276		9.99724	12	33
28	52	9.05164	111	0.94836	9.05441	112	0.94559	0.00277		9.99723	8	32
29	56	9.05275	111	0.94725	9.05553	113	0.94447	0.00279		9.99721	4	31
30	32	9.05386	111	0.94614	9.05666	112	0.94334	0.00280		9.99720	24	30
31	4	9.05497	110	0.94503	9.05778	112	0.94222	0.00282		9.99718	56	29
32	8	9.05607	110	0.94393	9.05890	112	0.94110	0.00283		9.99717	52	28
33	12	9.05717	110	0.94283	9.06002	111	0.93998	0.00284		9.99716	48	27
34	16	9.05827	110	0.94173	9.06113	111	0.93887	0.00286		9.99714	44	26
35	20	9.05937	109	0.94063	9.06224	111	0.93776	0.00287		9.99713	40	25
36	24	9.06046	109	0.93954	9.06335	110	0.93665	0.00289		9.99711	36	24
37	28	9.06155	109	0.93845	9.06445	111	0.93555	0.00290		9.99710	32	23
38	32	9.06264	108	0.93736	9.06556	110	0.93444	0.00292		9.99708	28	22
39	36	9.06372	109	0.93628	9.06666	109	0.93334	0.00293		9.99707	24	21
40	40	9.06481	108	0.93519	9.06775	110	0.93225	0.00295		9.99705	20	20
41	44	9.06589	107	0.93411	9.06885	109	0.93115	0.00296		9.99704	16	19
42	48	9.06696	108	0.93304	9.06994	109	0.93006	0.00298		9.99702	12	18
43	52	9.06804	107	0.93196	9.07103	108	0.92897	0.00299		9.99701	8	17
44	56	9.06911	107	0.93089	9.07211	109	0.92789	0.00301		9.99699	4	16
45	36	9.07018	106	0.92982	9.07320	108	0.92680	0.00302		9.99698	32	15
46	4	9.07124	107	0.92876	9.07428	108	0.92572	0.00304		9.99696	56	14
47	8	9.07231	106	0.92769	9.07536	107	0.92464	0.00305		9.99695	52	13
48	12	9.07337	105	0.92663	9.07643	108	0.92257	0.00307		9.99693	48	12
49	16	9.07442	106	0.92558	9.07751	107	0.92249	0.00308		9.99692	44	11
50	20	9.07548	105	0.92452	9.07858	106	0.92142	0.00310		9.99690	40	10
51	24	9.07653	105	0.92347	9.07964	107	0.92036	0.00311		9.99689	36	9
52	28	9.07758	105	0.92242	9.08071	106	0.91929	0.00313		9.99687	32	8
53	32	9.07863	105	0.92137	9.08177	106	0.91823	0.00314		9.99686	28	7
54	36	9.07968	104	0.92032	9.08283	106	0.91717	0.00316		9.99684	24	6
55	40	9.08072	104	0.91928	9.08389	106	0.91611	0.00317		9.99683	20	5
56	44	9.08176	104	0.91824	9.08495	105	0.91505	0.00319		9.99681	16	4
57	48	9.08280	103	0.91720	9.08600	105	0.91400	0.00320		9.99680	12	3
58	52	9.08383	103	0.91617	9.08705	105	0.91295	0.00322		9.99678	8	2
59	56	9.08486	103	0.91514	9.08810	104	0.91190	0.00323		9.99677	4	1
60	32	9.08589		0.91411	9.08914		0.91086	0.00325		9.99675	32	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 83°

P. p.

″	123	122	121
10	21	20	20
20	41	41	40
30	62	61	61
40	82	81	81
50	103	102	101
6	12	12	12
7	14	14	14
8	16	16	16
9	18	18	18
″	120	119	118
10	20	20	20
20	40	40	39
30	60	60	59
40	80	79	79
50	100	99	98
6	12	12	12
7	14	14	14
8	16	16	16
9	18	18	18
″	117	116	115
10	20	19	19
20	39	39	38
30	59	58	58
40	78	77	77
50	98	97	96
6	12	12	12
7	14	14	13
8	16	15	15
9	18	17	17
″	114	113	112
10	19	19	19
20	38	38	37
30	57	57	56
40	76	75	75
50	95	94	93
6	11	11	11
7	13	13	13
8	15	15	15
9	17	17	17
″	111	110	109
10	19	18	18
20	37	37	36
30	56	55	55
40	74	73	73
50	93	92	91
6	11	11	11
7	13	13	13
8	15	15	15
9	17	17	16
″	108	107	106
10	18	18	18
20	36	36	35
30	54	54	53
40	72	71	71
50	90	89	88
6	11	11	11
7	13	12	12
8	14	14	14
9	16	16	16
″	105	104	103
10	18	17	17
20	35	35	34
30	53	52	52
40	70	69	69
50	88	87	85
6	11	10	10
7	12	12	12
8	14	14	14
9	16	16	15

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T. 26)

7° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	28	9.08589	103	0.91411	9.08914	105	0.91086	0.00325		9.99675	32	60
1	4	9.08692	103	0.91308	9.09019	104	0.90981	0.00326		9.99674	56	59
2	8	9.08795	102	0.91205	9.09123	104	0.90877	0.00328		9.99672	52	58
3	12	9.08897	102	0.91103	9.09227	103	0.90773	0.00330		9.99670	48	57
4	16	9.08999	102	0.91001	9.09330	104	0.90670	0.00331		9.99669	44	56
5	20	9.09101	101	0.90899	9.09434	103	0.90566	0.00333		9.99667	40	55
6	24	9.09202	102	0.90798	9.09537	103	0.90463	0.00334		9.99666	36	54
7	28	9.09304	101	0.90696	9.09640	102	0.90360	0.00336		9.99664	32	53
8	32	9.09405	101	0.90595	9.09742	103	0.90258	0.00337		9.99663	28	52
9	36	9.09506	100	0.90494	9.09845	102	0.90155	0.00339		9.99661	24	51
10	40	9.09606	101	0.90394	9.09947	102	0.90053	0.00341		9.99659	20	50
11	44	9.09707	100	0.90293	9.10049	101	0.89951	0.00342		9.99658	16	49
12	48	9.09807	100	0.90193	9.10150	102	0.89850	0.00344		9.99656	12	48
13	52	9.09907	99	0.90093	9.10252	101	0.89748	0.00345		9.99655	8	47
14	56	9.10006	100	0.89994	9.10353	101	0.89647	0.00347		9.99653	4	46
15	29	9.10106	99	0.89894	9.10454	101	0.89546	0.00349		9.99651	31	45
16	4	9.10205	99	0.89795	9.10555	101	0.89445	0.00350		9.99650	56	44
17	8	9.10304	98	0.89696	9.10656	100	0.89344	0.00352		9.99648	52	43
18	12	9.10402	99	0.89598	9.10756	100	0.89244	0.00353		9.99647	48	42
19	16	9.10501	98	0.89499	9.10856	100	0.89144	0.00355		9.99645	44	41
20	20	9.10599	98	0.89401	9.10956	100	0.89044	0.00357		9.99643	40	40
21	24	9.10697	98	0.89303	9.11056	99	0.88944	0.00358		9.99642	36	39
22	28	9.10795	98	0.89205	9.11155	99	0.88845	0.00360		9.99640	32	38
23	32	9.10893	97	0.89107	9.11254	99	0.88746	0.00362		9.99638	28	37
24	36	9.10990	97	0.89010	9.11353	99	0.88647	0.00363		9.99637	24	36
25	40	9.11087	97	0.88913	9.11452	99	0.88548	0.00365		9.99635	20	35
26	44	9.11184	97	0.88816	9.11551	98	0.88449	0.00367		9.99633	16	34
27	48	9.11281	96	0.88719	9.11649	98	0.88351	0.00368		9.99632	12	33
28	52	9.11377	97	0.88623	9.11747	98	0.88253	0.00370		9.99630	8	32
29	56	9.11474	96	0.88526	9.11845	98	0.88155	0.00371		9.99629	4	31
30	30	9.11570	96	0.88430	9.11943	97	0.88057	0.00373		9.99627	29	30
31	4	9.11666	95	0.88334	9.12040	98	0.87960	0.00375		9.99625	56	29
32	8	9.11761	96	0.88239	9.12138	97	0.87862	0.00376		9.99624	52	28
33	12	9.11857	95	0.88143	9.12235	97	0.87765	0.00378		9.99622	48	27
34	16	9.11952	95	0.88048	9.12332	96	0.87668	0.00380		9.99620	44	26
35	20	9.12047	95	0.87953	9.12428	97	0.87572	0.00382		9.99618	40	25
36	24	9.12142	94	0.87858	9.12525	96	0.87475	0.00383		9.99617	36	24
37	28	9.12236	95	0.87764	9.12621	96	0.87379	0.00385		9.99615	32	23
38	32	9.12331	94	0.87669	9.12717	96	0.87283	0.00387		9.99613	28	22
39	36	9.12425	94	0.87575	9.12813	96	0.87187	0.00388		9.99612	24	21
40	40	9.12519	93	0.87481	9.12909	95	0.87091	0.00390		9.99610	20	20
41	44	9.12612	94	0.87388	9.13004	95	0.86996	0.00392		9.99608	16	19
42	48	9.12706	93	0.87294	9.13099	95	0.86901	0.00393		9.99607	12	18
43	52	9.12799	93	0.87201	9.13194	95	0.86806	0.00395		9.99605	8	17
44	56	9.12892	93	0.87108	9.13289	95	0.86711	0.00397		9.99603	4	16
45	31	9.12985	93	0.87015	9.13384	94	0.86616	0.00399		9.99601	29	15
46	4	9.13078	93	0.86922	9.13478	95	0.86522	0.00400		9.99600	56	14
47	8	9.13171	92	0.86829	9.13573	94	0.86427	0.00402		9.99598	52	13
48	12	9.13263	92	0.86737	9.13667	94	0.86333	0.00404		9.99596	48	12
49	16	9.13355	92	0.86645	9.13761	93	0.86239	0.00405		9.99595	44	11
50	20	9.13447	92	0.86553	9.13854	94	0.86146	0.00407		9.99593	40	10
51	24	9.13539	91	0.86461	9.13948	93	0.86052	0.00409		9.99591	36	9
52	28	9.13630	92	0.86370	9.14041	93	0.85959	0.00411		9.99589	32	8
53	32	9.13722	91	0.86278	9.14134	93	0.85866	0.00412		9.99588	28	7
54	36	9.13813	91	0.86187	9.14227	93	0.85773	0.00414		9.99586	24	6
55	40	9.13904	90	0.86096	9.14320	92	0.85680	0.00416		9.99584	20	5
56	44	9.13994	91	0.86006	9.14412	92	0.85588	0.00418		9.99582	16	4
57	48	9.14085	90	0.85915	9.14504	93	0.85496	0.00419		9.99581	12	3
58	52	9.14175	91	0.85825	9.14597	91	0.85403	0.00421		9.99579	8	2
59	56	9.14266	90	0.85734	9.14688	92	0.85312	0.00423		9.99577	4	1
60	32	9.14356		0.85644	9.14780		0.85220	0.00425		9.99575	28	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 82°

P. p.

″	105	104	1
10	15	17	1
20	35	35	3
30	52	52	5
40	70	69	6
50	88	87	8
6	11	10	1
7	12	12	1
8	14	14	1
9	16	10	1
″	102	101	1
10	17	17	1
20	34	34	3
30	51	51	5
40	68	67	6
50	85	84	8
6	10	10	1
7	12	12	1
8	14	13	1
9	15	15	1
″	99	98	9
10	17	16	1
20	33	33	3
30	50	49	4
40	66	65	6
50	83	82	8
6	10	10	1
7	12	11	1
8	13	13	1
9	15	15	1
″	96	95	9
10	16	16	1
20	32	32	3
30	48	48	4
40	64	63	6
50	80	79	7
6	10	10	9
7	11	11	1
8	13	13	1
9	14	14	1
″	93	92	9
10	16	15	1
20	31	31	3
30	47	46	4
40	62	61	6
50	78	77	7
6	9	9	9
7	11	11	1
8	12	12	1
9	14	14	1

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Logarithmos das linhas trigonometricas

T. 26)

8° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	32	9.14356	89	0.85644	9.14780	92	0.85220	0.00425		9.99575	28	60
1	4	9.14445	90	0.85555	9.14872	91	0.85128	0.00426		9.99574	56	59
2	8	9.14535	89	0.85465	9.14963	91	0.85037	0.00428		9.99572	52	58
3	12	9.14624	90	0.85376	9.15054	91	0.84946	0.00430		9.99570	48	57
4	16	9.14714	89	0.85286	9.15145	91	0.84855	0.00432		9.99568	44	56
5	20	9.14803	88	0.85197	9.15236	91	0.84764	0.00434		9.99566	40	55
6	24	9.14891	89	0.85109	9.15327	90	0.84673	0.00435		9.99565	36	54
7	28	9.14980	89	0.85020	9.15417	91	0.84583	0.00437		9.99563	32	53
8	32	9.15069	88	0.84931	9.15508	90	0.84492	0.00439		9.99561	28	52
9	36	9.15157	88	0.84843	9.15598	90	0.84402	0.00441		9.99559	24	51
10	40	9.15245	88	0.84755	9.15688	89	0.84312	0.00443		9.99557	20	50
11	44	9.15333	88	0.84667	9.15777	90	0.84223	0.00444		9.99556	16	49
12	48	9.15421	87	0.84579	9.15867	89	0.84133	0.00446		9.99554	12	48
13	52	9.15508	88	0.84492	9.15956	90	0.84044	0.00448		9.99552	8	47
14	56	9.15596	87	0.84404	9.16046	89	0.83954	0.00450		9.99550	4	46
15	32	9.15683	87	0.84317	9.16135	89	0.83865	0.00452		9.99548	27	45
16	4	9.15770	87	0.84230	9.16224	88	0.83776	0.00454		9.99546	56	44
17	8	9.15857	87	0.84143	9.16312	89	0.83688	0.00455		9.99545	52	43
18	12	9.15944	86	0.84056	9.16401	88	0.83599	0.00457		9.99543	48	42
19	16	9.16030	86	0.83970	9.16489	88	0.83511	0.00459		9.99541	44	41
20	20	9.16116	87	0.83884	9.16577	88	0.83423	0.00461		9.99539	40	40
21	24	9.16203	86	0.83797	9.16665	88	0.83335	0.00463		9.99537	36	39
22	28	9.16289	85	0.83711	9.16753	88	0.83247	0.00465		9.99535	32	38
23	32	9.16374	86	0.83626	9.16841	87	0.83159	0.00467		9.99533	28	37
24	36	9.16460	85	0.83540	9.16928	88	0.83072	0.00468		9.99532	24	36
25	40	9.16545	86	0.83455	9.17016	87	0.82984	0.00470		9.99530	20	35
26	44	9.16631	85	0.83369	9.17103	87	0.82897	0.00472		9.99528	16	34
27	48	9.16716	85	0.83284	9.17190	87	0.82810	0.00474		9.99526	12	33
28	52	9.16801	85	0.83199	9.17277	86	0.82723	0.00476		9.99524	8	32
29	56	9.16886	84	0.83114	9.17363	87	0.82637	0.00478		9.99522	4	31
30	34	9.16970	85	0.83030	9.17450	86	0.82550	0.00480		9.99520	26	30
31	4	9.17055	84	0.82945	9.17536	86	0.82464	0.00482		9.99518	56	29
32	8	9.17139	84	0.82861	9.17622	86	0.82378	0.00483		9.99517	52	28
33	12	9.17223	84	0.82777	9.17708	86	0.82292	0.00485		9.99515	48	27
34	16	9.17307	84	0.82693	9.17794	86	0.82206	0.00487		9.99513	44	26
35	20	9.17391	83	0.82609	9.17880	85	0.82120	0.00489		9.99511	40	25
36	24	9.17474	84	0.82526	9.17965	86	0.82035	0.00491		9.99509	36	24
37	28	9.17558	83	0.82442	9.18051	85	0.81949	0.00493		9.99507	32	23
38	32	9.17641	83	0.82359	9.18136	85	0.81864	0.00495		9.99505	28	22
39	36	9.17724	83	0.82276	9.18221	85	0.81779	0.00497		9.99503	24	21
40	40	9.17802	83	0.82193	9.18306	85	0.81694	0.00499		9.99501	20	20
41	44	9.17890	83	0.82110	9.18391	84	0.81609	0.00501		9.99499	16	19
42	48	9.17973	82	0.82027	9.18475	85	0.81525	0.00503		9.99497	12	18
43	52	9.18055	82	0.81945	9.18560	84	0.81440	0.00505		9.99495	8	17
44	56	9.18137	83	0.81863	9.18644	84	0.81356	0.00506		9.99494	4	16
45	36	9.18220	82	0.81780	9.18728	84	0.81272	0.00508		9.99492	25	15
46	4	9.18302	81	0.81698	9.18812	84	0.81188	0.00510		9.99490	56	14
47	8	9.18383	82	0.81617	9.18896	83	0.81104	0.00512		9.99488	52	13
48	12	9.18465	82	0.81535	9.18979	84	0.81021	0.00514		9.99486	48	12
49	16	9.18547	81	0.81453	9.19063	83	0.80937	0.00516		9.99484	44	11
50	20	9.18628	81	0.81372	9.19146	83	0.80854	0.00518		9.99482	40	10
51	24	9.18709	81	0.81291	9.19229	83	0.80771	0.00520		9.99480	36	9
52	28	9.18790	81	0.81210	9.19312	83	0.80688	0.00522		9.99478	32	8
53	32	9.18871	81	0.81129	9.19395	83	0.80605	0.00524		9.99476	28	7
54	36	9.18952	81	0.81048	9.19478	83	0.80522	0.00526		9.99474	24	6
55	40	9.19033	80	0.80967	9.19561	82	0.80439	0.00528		9.99472	20	5
56	44	9.19113	80	0.80887	9.19643	82	0.80357	0.00530		9.99470	16	4
57	48	9.19193	80	0.80807	9.19725	82	0.80275	0.00532		9.99468	12	3
58	52	9.19273	80	0.80727	9.19807	82	0.80193	0.00534		9.99466	8	2
59	56	9.19353	80	0.80647	9.19889	82	0.80111	0.00536		9.99464	4	1
60	28	9.19433		0.80567	9.19971		0.80029	0.00538		9.99462	24	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 81°

P. p.

″	91	90	89
10	15	15	15
20	30	30	30
30	46	45	45
40	61	60	59
50	76	75	74
6	9	9	9
7	11	11	10
8	12	12	12
9	14	14	13
″	88	87	86
10	15	15	14
20	29	29	29
30	44	44	43
40	59	58	57
50	73	73	72
6	9	9	9
7	10	10	10
8	12	12	11
9	13	13	13
″	85	84	83
10	14	14	14
20	28	28	28
30	43	42	42
40	57	56	55
50	71	70	69
6	9	8	8
7	10	10	10
8	11	11	11
9	13	13	12
″	82	81	80
10	14	14	13
20	27	27	27
30	41	41	40
40	55	54	53
50	68	68	67
6	8	8	8
7	10	9	9
8	11	11	11
9	12	12	12

P. p.

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9° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	36	9 19433	80	0.80567	9.19971	82	0.80029	0.00538		9.99462	24	60
1	4	9.19513	79	0.80487	9.20053	81	0.79947	0.00540		9.99460	56	59
2	8	9.19592	80	0.80408	9.20134	82	0.79866	0.00542		9.99458	52	58
3	12	9.19672	79	0.80328	9.20216	81	0.79784	0.00544		9.99456	48	57
4	16	9.19751	79	0.80249	9.20297	81	0.79703	0.00546		9.99454	44	56
5	20	9.19830	79	0.80170	9.20378	81	0.79622	0.00548		9.99452	40	55
6	24	9.19909	79	0.80091	9.20459	81	0.79541	0.00550		9.99450	36	54
7	28	9.19988	79	0.80012	9.20540	81	0.79460	0.00552		9.99448	32	53
8	32	9.20067	78	0.79933	9.20621	80	0.79379	0.00554		9.99446	28	52
9	36	9.20145	78	0.79855	9.20701	81	0.79299	0.00556		9.99444	24	51
10	40	9.20223	79	0.79777	9.20782	80	0.79218	0.00558		9.99442	20	50
11	44	9.20302	78	0.79698	9.20862	80	0.79138	0.00560		9.99440	16	49
12	48	9.20380	78	0.79620	9.20942	80	0.79058	0.00562		9.99438	12	48
13	52	9.20458	77	0.79542	9.21022	80	0.78978	0.00564		9.99436	8	47
14	56	9.20535	78	0.79465	9.21102	80	0.78898	0.00566		9.99434	4	46
15	32	9.20613	78	0.79387	9.21182	79	0.78818	0.00568		9.99432	32	45
16	4	9.20691	77	0.79309	9 21261	80	0.78739	0.00571		9.99429	56	44
17	8	9.20768	77	0.79232	9.21341	79	0.78659	0.00573		9.99427	52	43
18	12	9.20845	77	0.79155	9.21420	79	0.78580	0.00575		9.99425	48	42
19	16	9.20922	77	0.79078	9.21499	79	0.78501	0.00577		9.99423	44	41
20	20	9.20999	77	0.79001	9.21578	79	0.78422	0.00579		9.99421	40	40
21	24	9.21076	77	0.78924	9.21657	79	0.78343	0.00581		9.99419	36	39
22	28	9.21153	76	0.78847	9.21736	78	0.78264	0.00583		9.99417	32	38
23	32	9.21229	77	0.78771	9.21814	79	0.78186	0.00585		9.99415	28	37
24	36	9.21306	76	0.78694	9.21893	78	0.78107	0.00587		9.99413	24	36
25	40	9.21382	76	0.78618	9.21971	78	0.78029	0.00589		9.99411	20	35
26	44	9.21458	76	0.78542	9.22049	78	0.77951	0.00591		9.99409	16	34
27	48	9.21534	76	0.78466	9.22127	78	0.77873	0.00593		9.99407	12	33
28	52	9.21610	75	0.78390	9.22205	78	0.77795	0.00596		9.99404	8	32
29	56	9.21685	76	0.78315	9.22283	78	0.77717	0.00598		9.99402	4	31
30	28	9.21761	75	0.78239	9.22361	77	0.77639	0.00600		9.99400	32	30
31	4	9.21836	76	0.78164	9.22438	78	0.77562	0.00602		9.99398	56	29
32	8	9.21912	75	0.78088	9.22516	77	0.77484	0.00604		9.99396	52	28
33	12	9.21987	75	0.78013	9.22593	77	0.77407	0.00606		9.99394	48	27
34	16	9.22062	75	0.77938	9.22670	77	0.77330	0.00608		9.99392	44	26
35	20	9.22137	74	0.77863	9.22747	77	0.77253	0.00610		9.99390	40	25
36	24	9.22211	75	0.77789	9.22824	77	0.77176	0.00612		9.99388	36	24
37	28	9.22286	75	0.77714	9.22901	76	0.77099	0.00615		9.99385	32	23
38	32	9.22361	74	0.77639	9.22977	77	0.77023	0.00617		9.99383	28	22
39	36	9.22435	74	0.77565	9.23054	76	0.76946	0.00619		9.99381	24	21
40	40	9.22509	74	0.77491	9.23130	76	0.76870	0.00621		9.99379	20	20
41	44	9.22583	74	0.77417	9.23206	77	0.76794	0.00623		9.99377	16	19
42	48	9.22657	74	0.77343	9.23283	76	0.76717	0.00625		9.99375	12	18
43	52	9.22731	74	0.77269	9.23359	76	0.76641	0.00628		9.99372	8	17
44	56	9.22805	73	0.77195	9.23435	75	0.76565	0.00630		9.99370	4	16
45	30	9.22878	74	0.77122	9.23510	76	0.76490	0.00632		9.99368	31	15
46	4	9.22952	73	0.77048	9.23586	75	0.76414	0.00634		9.99366	56	14
47	8	9.23025	73	0.76975	9.23661	76	0.76339	0.00636		9.99364	52	13
48	12	9.23098	73	0.76902	9.23737	75	0.76263	0.00638		9.99362	48	12
49	16	9.23171	73	0.76829	9.23812	75	0.76188	0.00641		9.99359	44	11
50	20	9.23244	73	0.76756	9.23887	75	0.76113	0.00643		9.99357	40	10
51	24	9.23317	73	0.76683	9.23962	75	0.76038	0.00645		9.99355	36	9
52	28	9.23390	72	0.76610	9.24037	75	0.75963	0.00647		9.99353	32	8
53	32	9.23462	73	0.76538	9.24112	74	0.75888	0.00649		9.99351	28	7
54	36	9.23535	72	0.76465	9.24186	75	0.75814	0.00652		9.99348	24	6
55	40	9.23607	72	0.76393	9.24261	74	0.75739	0.00654		9.99346	20	5
56	44	9.23679	73	0.76321	9.24335	75	0.75665	0.00656		9.99344	16	4
57	48	9.23752	71	0.76248	9.24410	74	0.75590	0.00658		9.99342	12	3
58	52	9.23823	72	0.76177	9.24484	74	0.75516	0.00660		9.99340	8	2
59	56	9.23895	72	0.76105	9.24558	74	0.75442	0.00663		9.99337	4	1
60	40	9.23967		0.76033	9.24632		0.75368	0.00665		9.99335	20	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 80°

P. p.

	82	81	8
10	14	14	1
20	27	27	2
30	41	41	4
40	55	54	5
50	68	68	6
6	8	8	
7	10	9	9
8	11	11	1
9	12	12	1

	79	78	7
10	13	13	1
20	26	26	2
30	40	39	3
40	53	52	5
50	66	65	6
6	8	8	
7	9	9	9
8	11	10	1
9	12	12	1

	76	75	7
10	13	13	1
20	25	25	2
30	38	38	3
40	51	50	4
50	63	63	6
6	8	8	
7	9	9	9
8	10	10	1
9	11	11	1

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10° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	40	9.23967	72	0.76033	9.24632	74	0.75368	0.00665		9.99335	20	60
1	4	9.24039	71	0.75961	9.24706	73	0.75294	0.00667		9.99333	56	59
2	8	9.24110	71	0.75890	9.24779	74	0.75221	0.00669		9.99331	52	58
3	12	9.24181	72	0.75819	9.24853	73	0.75147	0.00672		9.99328	48	57
4	16	9.24253	71	0.75747	9.24926	74	0.75074	0.00674		9.99326	44	56
5	20	9.24324	71	0.75676	9.25000	73	0.75000	0.00676		9.99324	40	55
6	24	9.24395	71	0.75605	9.25073	73	0.74927	0.00678		9.99322	36	54
7	28	9.24466	70	0.75534	9.25146	73	0.74854	0.00681		9.99319	32	53
8	32	9.24536	71	0.75464	9.25219	73	0.74781	0.00683		9.99317	28	52
9	36	9.24607	70	0.75393	9.25292	73	0.74708	0.00685		9.99315	24	51
10	40	9.24677	71	0.75323	9.25365	72	0.74635	0.00687		9.99313	20	50
11	44	9.24748	70	0.75252	9.25437	73	0.74563	0.00690		9.99310	16	49
12	48	9.24818	70	0.75182	9.25510	72	0.74490	0.00692		9.99308	12	48
13	52	9.24888	70	0.75112	9.25582	73	0.74418	0.00694		9.99306	8	47
14	56	9.24958	70	0.75042	9.25655	72	0.74345	0.00696		9.99304	4	46
15	41	9.25028	70	0.74972	9.25727	72	0.74273	0.00699		9.99301	19	45
16	4	9.25098	70	0.74902	9.25799	72	0.74201	0.00701		9.99299	56	44
17	8	9.25168	69	0.74832	9.25871	72	0.74129	0.00703		9.99297	52	43
18	12	9.25237	70	0.74763	9.25943	72	0.74057	0.00706		9.99294	48	42
19	16	9.25307	69	0.74693	9.26015	71	0.73985	0.00708		9.99292	44	41
20	20	9.25376	69	0.74624	9.26086	72	0.73914	0.00710		9.99290	40	40
21	24	9.25445	69	0.74555	9.26158	71	0.73842	0.00712		9.99288	36	39
22	28	9.25514	69	0.74486	9.26229	72	0.73771	0.00715		9.99285	32	38
23	32	9.25583	69	0.74417	9.26301	71	0.73699	0.00717		9.99283	28	37
24	36	9.25652	69	0.74348	9.26372	71	0.73628	0.00719		9.99281	24	36
25	40	9.25721	69	0.74279	9.26443	71	0.73557	0.00722		9.99278	20	35
26	44	9.25790	68	0.74210	9.26514	71	0.73486	0.00724		9.99276	16	34
27	48	9.25858	69	0.74142	9.26585	70	0.73415	0.00726		9.99274	12	33
28	52	9.25927	68	0.74073	9.26655	71	0.73345	0.00729		9.99271	8	32
29	56	9.25995	68	0.74005	9.26726	71	0.73274	0.00731		9.99269	4	31
30	42	9.26063	68	0.73937	9.26797	70	0.73203	0.00733		9.99267	18	30
31	4	9.26131	68	0.73869	9.26867	70	0.73133	0.00736		9.99264	56	29
32	8	9.26199	68	0.73801	9.26937	71	0.73063	0.00738		9.99262	52	28
33	12	9.26267	68	0.73733	9.27008	70	0.72992	0.00740		9.99260	48	27
34	16	9.26335	68	0.73665	9.27078	70	0.72922	0.00743		9.99257	44	26
35	20	9.26403	67	0.73597	9.27148	70	0.72852	0.00745		9.99255	40	25
36	24	9.26470	68	0.73530	9.27218	70	0.72782	0.00748		9.99252	36	24
37	28	9.26538	67	0.73462	9.27288	69	0.72712	0.00750		9.99250	32	23
38	32	9.26605	67	0.73395	9.27357	70	0.72643	0.00752		9.99248	28	22
39	36	9.26672	67	0.73328	9.27427	69	0.72573	0.00755		9.99245	24	21
40	40	9.26739	67	0.73261	9.27496	70	0.72504	0.00757		9.99243	20	20
41	44	9.26806	67	0.73194	9.27566	69	0.72434	0.00759		9.99241	16	19
42	48	9.26873	67	0.73127	9.27635	69	0.72365	0.00762		9.99238	12	18
43	52	9.26940	67	0.73060	9.27704	69	0.72296	0.00764		9.99236	8	17
44	56	9.27007	66	0.72993	9.27773	69	0.72227	0.00767		9.99233	2	16
45	43	9.27073	67	0.72927	9.27842	69	0.72158	0.00769		9.99231	13	15
46	4	9.27140	66	0.72860	9.27911	69	0.72089	0.00771		9.99229	56	14
47	8	9.27206	67	0.72794	9.27980	69	0.72020	0.00774		9.99226	52	13
48	12	9.27273	66	0.72722	9.28049	68	0.71951	0.00776		9.99224	48	12
49	16	9.27339	66	0.72661	9.28117	69	0.71883	0.00779		9.99221	44	11
50	20	9.27405	66	0.72595	9.28186	68	0.71814	0.00781		9.99219	40	10
51	24	9.27471	66	0.72529	9.28254	69	0.71746	0.00783		9.99217	36	9
52	28	9.27537	65	0.72463	9.28323	68	0.71677	0.00786		9.99214	32	8
53	32	9.27602	66	0.72398	9.28391	68	0.71609	0.00788		9.99212	28	7
54	36	9.27668	66	0.72332	9.28459	68	0.71541	0.00791		9.99209	24	6
55	40	9.27734	65	0.72266	9.28527	68	0.71473	0.00793		9.99207	20	5
56	44	9.27799	65	0.72201	9.28595	67	0.71405	0.00796		9.99204	16	4
57	48	9.27864	66	0.72136	9.28662	68	0.71338	0.00798		9.99202	12	3
58	52	9.27930	65	0.72070	9.28730	68	0.71270	0.00800		9.99200	8	2
59	56	9.27995	65	0.72005	9.28798	67	0.71202	0.00803		9.99197	4	1
60	44	9.28060		0.71940	9.28865		0.71135	0.00805		9.99195	16	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	79°

P. p.

	73	72	71
10	12	12	12
20	24	24	24
30	37	36	36
40	49	48	47
50	61	60	59
6	7	7	7
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9	11	11	11

	70	69	68
10	12	12	11
20	23	23	23
30	35	35	34
40	47	46	45
50	58	58	57
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9	11	10	10

	67	66	65
10	11	11	11
20	22	22	22
30	34	33	33
40	45	44	43
50	56	55	54
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9	10	10	10

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Logarithmos das linhas trigonometricas

T. 26)

11° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	44	9.28060	65	0.71940	9.28865	68	0.71135	0.00805		9.99195	16	60
1	4	9.28125	65	0.71875	9.28933	67	0.71067	0.00808		9.99192	56	59
2	8	9.28190	64	0.71810	9.29000	67	0.71000	0.00810		9.99190	52	58
3	12	9.28254	65	0.71746	9.29067	67	0.70933	0.00813		9.99187	48	57
4	16	9.28319	65	0.71681	9.29134	67	0.70866	0.00815		9.99185	44	56
5	20	9.28384	64	0.71616	9.29201	67	0.70799	0.00818		9.99182	40	55
6	24	9.28448	64	0.71552	9.29268	67	0.70732	0.00820		9.99180	36	54
7	28	9.28512	65	0.71488	9.29335	67	0.70665	0.00823		9.99177	32	53
8	32	9.28577	64	0.71423	9.29402	66	0.70598	0.00825		9.99175	28	52
9	36	9.28641	64	0.71359	9.29468	67	0.70532	0.00828		9.99172	24	51
10	40	9.28705	64	0.71295	9.29535	66	0.70465	0.00830		9.99170	20	50
11	44	9.28769	64	0.71231	9.29601	67	0.70399	0.00833		9.99167	16	49
12	48	9.28833	63	0.71167	9.29668	66	0.70332	0.00835		9.99165	12	48
13	52	9.28896	64	0.71104	9.29734	66	0.70266	0.00838		9.99162	8	47
14	56	9.28960	64	0.71040	9.29800	66	0.70200	0.00840		9.99160	4	46
15	45	9.29024	63	0.70976	9.29866	66	0.70134	0.00843		9.99157	15	45
16	4	9.29087	63	0.70913	9.29932	66	0.70068	0.00845		9.99155	56	44
17	8	9.29150	64	0.70850	9.29998	66	0.70002	0.00848		9.99152	52	43
18	12	9.29214	63	0.70786	9.30064	66	0.69936	0.00850		9.99150	48	42
19	16	9.29277	63	0.70723	9.30130	65	0.69870	0.00853		9.99147	44	41
20	20	9.29340	63	0.70660	9.30195	66	0.69805	0.00855		9.99145	40	40
21	24	9.29403	63	0.70597	9.30261	65	0.69739	0.00858		9.99142	36	39
22	28	9.29466	63	0.70534	9.30326	65	0.69674	0.00860		9.99140	32	38
23	32	9.29529	62	0.70471	9.30391	66	0.69609	0.00863		9.99137	28	37
24	36	9.29591	63	0.70409	9.30457	65	0.69543	0.00865		9.99135	24	36
25	40	9.29654	62	0.70346	9.30522	65	0.69478	0.00868		9.99132	20	35
26	44	9.29716	63	0.70284	9.30587	65	0.69413	0.00870		9.99130	16	34
27	48	9.29779	62	0.70221	9.30652	65	0.69348	0.00873		9.99127	12	33
28	52	9.29841	62	0.70159	9.30717	65	0.69283	0.00876		9.99124	8	32
29	56	9.29903	63	0.70097	9.30782	64	0.69218	0.00878		9.99122	4	31
30	46	9.29966	62	0.70034	9.30846	65	0.69154	0.00881		9.99119	14	30
31	4	9.30028	62	0.69972	9.30911	64	0.69089	0.00883		9.99117	56	29
32	8	9.30090	61	0.69910	9.30975	65	0.69025	0.00886		9.99114	52	28
33	12	9.30151	62	0.69849	9.31040	64	0.68960	0.00888		9.99112	48	27
34	16	9.30213	62	0.69787	9.31104	64	0.68896	0.00891		9.99109	44	26
35	20	9.30275	61	0.69725	9.31168	65	0.68832	0.00894		9.99106	40	25
36	24	9.30336	62	0.69664	9.31233	64	0.68767	0.00896		9.99104	36	24
37	28	9.30398	61	0.69602	9.31297	64	0.68703	0.00899		9.99101	32	23
38	32	9.30459	62	0.69541	9.31361	64	0.68639	0.00901		9.99099	28	22
39	36	9.30521	61	0.69479	9.31425	64	0.68575	0.00904		9.99096	24	21
40	40	9.30582	61	0.69418	9.31489	63	0.68511	0.00907		9.99093	20	20
41	44	9.30643	61	0.69357	9.31552	64	0.68448	0.00909		9.99091	16	19
42	48	9.30704	61	0.69296	9.31616	63	0.68384	0.00912		9.99088	12	18
43	52	9.30765	61	0.69235	9.31679	64	0.68321	0.00914		9.99086	8	17
44	56	9.30826	61	0.69174	9.31743	63	0.68257	0.00917		9.99083	4	16
45	47	9.30887	60	0.69113	9.31806	64	0.68194	0.00920		9.99080	13	15
46	4	9.30947	61	0.69053	9.31870	63	0.68130	0.00922		9.99078	56	14
47	8	9.31008	60	0.68992	9.31933	63	0.68067	0.00925		9.99075	52	13
48	12	9.31068	61	0.68932	9.31996	63	0.68004	0.00928		9.99072	48	12
49	16	9.31129	60	0.68871	9.32059	63	0.67941	0.00930		9.99070	44	11
50	20	9.31189	61	0.68811	9.32122	63	0.67878	0.00933		9.99067	40	10
51	24	9.31250	60	0.68750	9.32185	63	0.67815	0.00936		9.99064	36	9
52	28	9.31310	60	0.68690	9.32248	63	0.67752	0.00938		9.99062	32	8
53	32	9.31370	60	0.68630	9.32311	62	0.67689	0.00941		9.99059	28	7
54	36	9.31430	60	0.68570	9.32373	63	0.67627	0.00944		9.99056	24	6
55	40	9.31490	59	0.68510	9.32436	62	0.67564	0.00946		9.99054	20	5
56	44	9.31549	60	0.68451	9.32498	63	0.67502	0.00949		9.99051	16	4
57	48	9.31609	60	0.68391	9.32561	62	0.67439	0.00952		9.99048	12	3
58	52	9.31669	59	0.68331	9.32623	62	0.67377	0.00954		9.99046	8	2
59	56	9.31728	60	0.68272	9.32685	62	0.67315	0.00957		9.99043	4	1
60	48	9.31788		0.68212	9.32747		0.67253	0.00960		9.99040	12	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 78°

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	68	67	66
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20	23	22	22
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50	57	56	55
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9	10	10	10

	65	64	63
10	11	11	11
20	22	21	21
30	33	32	32
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6	7	6	6
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8	9	9	8
9	10	10	9

	62	61	60
10	10	10	10
20	21	20	20
30	31	31	30
40	41	41	40
50	52	51	50
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Logarithmos das linhas trigonometricas

T. 26)

12° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	48	9.31788	59	0.68212	9.32747	63	0.67253	0.00960		9.99040	12	60
1	4	9.31847	60	0.68153	9.32810	62	0.67190	0.00962		9.99038	56	59
2	8	9.31907	59	0.68093	9.32872	61	0.67128	0.00965		9.99035	52	58
3	12	9.31966	59	0.68034	9.32933	62	0.67067	0.00968		9.99032	48	57
4	16	9.32025	59	0.67975	9.32995	62	0.67005	0.00970		9.99030	44	56
5	20	9.32084	59	0.67916	9.33057	62	0.66943	0.00973		9.99027	40	55
6	24	9.32143	59	0.67857	9.33119	61	0.66881	0.00976		9.99024	36	54
7	28	9.32202	59	0.67798	9.33180	62	0.66820	0.00978		9.99022	32	53
8	32	9.32261	58	0.67739	9.33242	61	0.66758	0.00981		9.99019	28	52
9	36	9.32319	59	0.67681	9.33303	62	0.66697	0.00984		9.99016	24	51
10	40	9.32378	59	0 67622	9.33365	61	0.66635	0.00987		9.99013	20	50
11	44	9.32437	58	0.67563	9.33426	61	0.66574	0.00989		9.99011	16	49
12	48	9.32495	58	0.67505	9.33487	61	0.66513	0.00992		9.99008	12	48
13	52	9.32553	59	0.67447	9.33548	61	0.66452	0.00995		9.99005	8	47
14	56	9.32612	58	0.67388	9.33609	61	0.66391	0.00998		9.99002	4	46
15	49	9.32670	58	0.67330	9.33670	61	0.66330	0.01000		9.99000	11	45
16	4	9.32728	58	0.67272	9.33731	61	0.66269	0.01003		9.98997	56	44
17	8	9.32786	58	0.67214	9.33792	61	0.66208	0.01006		9.98994	52	43
18	12	9.32844	58	0.67156	9.33853	60	0.66147	0.01009		9.98991	48	42
19	16	9.32902	58	0.67098	9.33913	61	0.66087	0.01011		9.98989	44	41
20	20	9.32960	58	0.67040	9.33974	60	0.66026	0.01014		9.98986	40	40
21	24	9.33018	57	0.66982	9.34034	61	0.65966	0.01017		9.98983	36	39
22	28	9.33075	58	0.66925	9.34095	60	0.65905	0.01020		9.98980	32	38
23	32	9.33133	57	0 66867	9.34155	60	0.65845	0.01022		9.98978	28	37
24	36	9.33190	58	0.66810	9.34215	61	0.65785	0.01025		9.98975	24	36
25	40	9.33248	57	0.66752	9.34276	60	0.65724	0.01028		9.98972	20	35
26	44	9.33305	57	0.66695	9.34336	60	0.65664	0.01031		9.98969	16	34
27	48	9.33362	58	0.66638	9.34396	60	0.65604	0.01033		9.98967	12	33
28	52	9.33420	57	0.66580	9.34456	60	0.65544	0.01036		9.98964	8	32
29	56	9.33477	57	0.66523	9.34516	60	0.65484	0.01039		9.98961	4	31
30	50	9.33534	57	0.66466	9.34576	59	0.65424	0.01042		9.98958	10	30
31	4	9.33591	56	0.66409	9.34635	60	0.65365	0.01045		9.98955	56	29
32	8	9.33647	57	0.66353	9.34695	60	0.65305	0.01047		9.98953	52	28
33	12	9.33704	57	0.66296	9.34755	59	0.65245	0.01050		9.98950	48	27
34	16	9.33761	57	0.66239	9.34814	60	0.65186	0.01053		9.98947	44	26
35	20	9.33818	56	0.66182	9.34874	59	0.65126	0.01056		9.98944	40	25
36	24	9.33874	57	0.66126	9.34933	59	0.65067	0.01059		9.98941	36	24
37	28	9.33931	56	0.66069	9.34992	59	0.65008	0.01062		9.98938	32	23
38	32	9.33987	56	0.66013	9.35051	60	0.64949	0.01064		9.98936	28	22
39	36	9.34043	57	0.65957	9.35111	59	0.64889	0.01067		9.98933	24	21
40	40	9.34100	56	0.65900	9.35170	59	0.64830	0.01070		9.98930	20	20
41	44	9.34156	56	0.65844	9.35229	59	0.64771	0.01073		9.98927	16	19
42	48	9.34212	56	0.65788	9.35288	59	0.64712	0.01076		9.98924	12	18
43	52	9.34268	56	0.65732	9.35347	58	0.64653	0.01079		9.98921	8	17
44	56	9.34324	56	0.65676	9.35405	59	0.64595	0.01081		9.98919	4	16
45	51	9.34380	56	0.65620	9.35464	59	0.64536	0.01084		9.98916	0	15
46	4	9.34436	55	0.65564	9.35523	58	0.64477	0.01087		9.98913	56	14
47	8	9.34491	56	0.65509	9.35581	59	0.64419	0.01090		9.98910	52	13
48	12	9.34547	55	0.65453	9.35640	58	0.64360	0.01093		9.98907	48	12
49	16	9.34602	56	0.65398	9.35698	59	0.64302	0.01096		9.98904	44	11
50	20	9.34658	55	0.65342	9.35757	58	0.64243	0.01099		9.98901	40	10
51	24	9.34713	56	0.65287	9.35815	58	0.64185	0.01102		9.98898	36	9
52	28	9.34769	55	0.65231	9.35873	58	0.64127	0.01104		9.98896	32	8
53	32	9.34824	55	0.65176	9.35931	58	0.64069	0.01107		9.98893	28	7
54	36	9.34879	55	0.65121	9.35989	58	0.64011	0.01110		9.98890	24	6
55	40	9.34934	55	0.65066	9.36047	58	0.63953	0.01113		9.98887	20	5
56	44	9.34989	55	0.65011	9.36105	58	0 63895	0.01116		9.98884	16	4
57	48	9.35044	55	0.64956	9.36163	58	0.63837	0.01119		9.98881	12	3
58	52	9.35099	55	0.64901	9.36221	58	0.63779	0.01122		9.98878	8	2
59	56	9.35154	55	0.64846	9.36279	57	0.63721	0.01125		9.98875	4	1
60	52	9.35209		0.64791	9.36336		0.63664	0.01128		9.98872	0	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 77°

P. p.

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10	11	10	10
20	21	21	20
30	32	31	31
40	42	41	41
50	53	52	51
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

″	60	59	58
10	10	10	10
20	20	20	19
30	30	30	29
40	40	39	39
50	50	49	48
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

″	57	56	55
10	10	9	9
20	19	19	18
30	29	28	28
40	38	37	37
50	48	47	46
6	6	6	6
7	7	7	6
8	8	7	7
9	9	8	8

P. p.

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Logarithmos das linhas trigonometricas

T. 26)

13° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	58	9.35209	54	0.64791	9.36336	58	0.63664	0.01128		9.98872	8	60
1	4	9.35263	55	0.64737	9.36394	58	0.63606	0.01131		9.98869	56	59
2	8	9.35318	55	0.64682	9.36452	57	0.63548	0.01133		9.98867	52	58
3	12	9.35373	54	0.64627	9.36509	57	0.63491	0.01136		9.98864	48	57
4	16	9.35427	54	0.64573	9.36566	58	0.63434	0.01139		9.98861	44	56
5	20	9.35481	55	0.64519	9.36624	57	0.63376	0.01142		9.98858	40	55
6	24	9.35536	54	0.64464	9.36681	57	0.63319	0.01145		9.98855	36	54
7	28	9.35590	54	0.64410	9.36738	57	0.63262	0.01148		9.98852	32	53
8	32	9.35644	54	0.64356	9.36795	57	0.63205	0.01151		9.98849	28	52
9	36	9.35698	54	0.64302	9.36852	57	0.63148	0.01154		9.98846	24	51
10	40	9.35752	54	0.64248	9.36909	57	0.63091	0.01157		9.98843	20	50
11	44	9.35806	54	0.64194	9.36966	57	0.63034	0.01160		9.98840	16	49
12	48	9.35860	54	0.64140	9.37023	57	0.62977	0.01163		9.98837	12	48
13	52	9.35914	54	0.64086	9.37080	57	0.62920	0.01166		9.98834	8	47
14	56	9.35968	54	0.64032	9.37137	56	0.62863	0.01169		9.98831	4	46
15	59	9.36022	53	0.63978	9.37193	57	0.62807	0.01172		9.98828	7	45
16	4	9.36075	54	0.63925	9.37250	56	0.62750	0.01175		9.98825	56	44
17	8	9.36129	53	0.63871	9.37306	57	0.62694	0.01178		9.98822	52	43
18	12	9.36182	54	0.63818	9.37363	56	0.62637	0.01181		9.98819	48	42
19	16	9.36236	53	0.63764	9.37419	57	0.62581	0.01184		9.98816	44	41
20	20	9.36289	53	0.63711	9.37476	56	0.62524	0.01187		9.98813	40	40
21	24	9.36342	53	0.63658	9.37532	56	0.62468	0.01190		9.98810	36	39
22	28	9.36395	54	0.63605	9.37588	56	0.62412	0.01193		9.98807	32	38
23	32	9.36449	53	0.63551	9.37644	56	0.62356	0.01196		9.98804	28	37
24	36	9.36502	53	0.63498	9.37700	56	0.62300	0.01199		9.98801	24	36
25	40	9.36555	53	0.63445	9.37756	56	0.62244	0.01202		9.98798	20	35
26	44	9.36608	52	0.63392	9.37812	56	0.62188	0.01205		9.98795	16	34
27	48	9.36660	53	0.63340	9.37868	56	0.62132	0.01208		9.98792	12	33
28	52	9.36713	53	0.63287	9.37924	56	0.62076	0.01211		9.98789	8	32
29	56	9.36766	53	0.63234	9.37980	55	0.62020	0.01214		9.98786	4	31
30	59	9.36819	52	0.63181	9.38035	56	0.61965	0.01217		9.98783	8	30
31	4	9.36871	53	0.63129	9.38091	56	0.61909	0.01220		9.98780	56	29
32	8	9.36924	52	0.63076	9.38147	55	0.61853	0.01223		9.98777	52	28
33	12	9.36976	52	0.63024	9.38202	55	0.61798	0.01226		9.98774	48	27
34	16	9.37028	53	0.62972	9.38257	56	0.61743	0.01229		9.98771	44	26
35	20	9.37081	52	0.62919	9.38313	55	0.61687	0.01232		9.98768	40	25
36	24	9.37133	52	0.62867	9.38368	55	0.61632	0.01235		9.98765	36	24
37	28	9.37185	52	0.62815	9.38423	56	0.61577	0.01238		9.98762	32	23
38	32	9.37237	52	0.62763	9.38479	55	0.61521	0.01241		9.98759	28	22
39	36	9.37289	52	0.62711	9.38534	55	0.61466	0.01244		9.98756	24	21
40	40	9.37341	52	0.62659	9.38589	55	0.61411	0.01247		9.98753	20	20
41	44	9.37393	52	0.62607	9.38644	55	0.61356	0.01250		9.98750	16	19
42	48	9.37445	52	0.62555	9.38699	55	0.61301	0.01254		9.98746	12	18
43	52	9.37497	52	0.62503	9.38754	54	0.61246	0.01257		9.98743	8	17
44	56	9.37549	51	0.62451	9.38808	55	0.61192	0.01260		9.98740	4	16
45	59	9.37600	52	0.62400	9.38863	55	0.61137	0.01263		9.98737	5	15
46	4	9.37652	51	0.62348	9.38918	54	0.61082	0.01266		9.98734	56	14
47	8	9.37703	52	0.62297	9.38972	55	0.61028	0.01269		9.98731	52	13
48	12	9.37755	51	0.62245	9.39027	55	0.60973	0.01272		9.98728	48	12
49	16	9.37806	52	0.62194	9.39082	54	0.60918	0.01275		9.98725	44	11
50	20	9.37858	51	0.62142	9.39136	54	0.60864	0.01278		9.98722	40	10
51	24	9.37909	51	0.62091	9.39190	55	0.60810	0.01281		9.98719	36	9
52	28	9.37960	51	0.62040	9.39245	54	0.60755	0.01285		9.98715	32	8
53	32	9.38011	51	0.61989	9.39299	54	0.60701	0.01288		9.98712	28	7
54	36	9.38062	51	0.61938	9.39353	54	0.60647	0.01291		9.98709	24	6
55	40	9.38113	51	0.61887	9.39407	54	0.60593	0.01294		9.98706	20	5
56	44	9.38164	51	0.61836	9.39461	54	0.60539	0.01297		9.98703	16	4
57	48	9.38215	51	0.61785	9.39515	54	0.60485	0.01300		9.98700	12	3
58	52	9.38266	51	0.61734	9.39569	54	0.60431	0.01303		9.98697	8	2
59	56	9.38317	51	0.61683	9.39623	54	0.60377	0.01306		9.98694	4	1
60	59	9.38368		0.61632	9.39677		0.60323	0.01310		9.98690	4	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 76°

P. p.

″ 54 58
10 9 10
20 18 19
30 27 29
40 36 39
50 45 48
6 5 6
7 6 7
8 7 8
9 8 9

″ 53 57
10 9 10
20 18 19
30 27 28
40 35 38
50 44 48
6 5 6
7 6 7
8 7 8
9 8 9

″ 52 56
10 9 9
20 17 19
30 26 28
40 35 37
50 43 47
6 5 6
7 6 7
8 7 8
9 8 8

″ 51 55
10 9 9
20 17 18
30 26 28
40 34 37
50 43 46
6 5 6
7 6 6
8 7 7
9 8 8

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Logarithmos das linhas trigonometricas

T. 26)

14° ′	0h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	56	9.38368	50	0.61632	9.39677	54	0.60323	0.01310		9.98690	4	60
1	4	9.38418	51	0.61582	9.39731	54	0.60269	0.01313		9.98687	56	59
2	8	9.38469	50	0.61531	9.39785	53	0.60215	0.01316		9.98684	52	58
3	12	9.38519	51	0.61481	9.39838	54	0.60162	0.01319		9.98681	48	57
4	16	9.38570	50	0.61430	9.39892	53	0.60108	0.01322		9.98678	44	56
5	20	9.38620	50	0.61380	9.39945	54	0.60055	0.01325		9.98675	40	55
6	24	9.38670	51	0.61330	9.39999	53	0.60001	0.01329		9.98671	36	54
7	28	9.38721	50	0.61279	9.40052	54	0.59948	0.01332		9.98668	32	53
8	32	9.38771	50	0.61229	9.40106	53	0.59894	0.01335		9.98665	28	52
9	36	9.38821	50	0.61179	9.40159	53	0.59841	0.01338		9.98662	24	51
10	40	9.38871	50	0.61129	9.40212	54	0.59788	0.01341		9.98659	20	50
11	44	9.38921	50	0.61079	9.40266	53	0.59734	0.01344		9.98656	16	49
12	48	9.38971	50	0.61029	9.40319	53	0.59681	0.01348		9.98652	12	48
13	52	9.39021	50	0.60979	9.40372	53	0.59628	0.01351		9.98649	8	47
14	56	9.39071	50	0.60929	9.40425	53	0.59575	0.01354		9.98646	4	46
15	57	9.39121	49	0.60879	9.40478	53	0.59522	0.01357		9.98643	3	45
16	4	9.39170	50	0.60830	9.40531	53	0.59469	0.01360		9.98640	56	44
17	8	9.39220	50	0.60780	9.40584	52	0.59416	0.01364		9.98636	52	43
18	12	9.39270	49	0.60730	9.40636	53	0.59364	0.01367		9.98633	48	42
19	16	9.39319	50	0.60681	9.40689	53	0.59311	0.01370		9.98630	44	41
20	20	9.39369	49	0.60631	9.40742	53	0.59258	0.01373		9.98627	40	40
21	24	9.39418	49	0.60582	9.40795	52	0.59205	0.01377		9.98623	36	39
22	28	9.39467	50	0.60533	9.40847	53	0.59153	0.01380		9.98620	32	38
23	32	9.39517	49	0.60483	9.40900	52	0.59100	0.01383		9.98617	28	37
24	36	9.39566	49	0.60434	9.40952	53	0.59048	0.01386		9.98614	24	36
25	40	9.39615	49	0.60385	9.41005	52	0.58995	0.01390		9.98610	20	35
26	44	9.39664	49	0.60336	9.41057	52	0.58943	0.01393		9.98607	16	34
27	48	9.39713	49	0.60287	9.41109	52	0.58891	0.01396		9.98604	12	33
28	52	9.39762	49	0.60238	9.41161	53	0.58839	0.01399		9.98601	8	32
29	56	9.39811	49	0.60189	9.41214	52	0.58786	0.01403		9.98597	4	31
30	58	9.39860	49	0.60140	9.41266	52	0.58734	0.01406		9.98594	2	30
31	4	9.39909	49	0.60091	9.41318	52	0.58682	0.01409		9.98591	56	29
32	8	9.39958	48	0.60042	9.41370	52	0.58630	0.01412		9.98588	52	28
33	12	9.40006	49	0.59994	9.41422	52	0.58578	0.01416		9.98584	48	27
34	16	9.40055	48	0.59945	9.41474	52	0.58526	0.01419		9.98581	44	26
35	20	9.40103	49	0.59897	9.41526	52	0.58474	0.01422		9.98578	40	25
36	24	9.40152	48	0.59848	9.41578	51	0.58422	0.01426		9.98574	36	24
37	28	9.40200	49	0.59800	9.41629	52	0.58371	0.01429		9.98571	32	23
38	32	9.40249	48	0.59751	9.41681	52	0.58319	0.01432		9.98568	28	22
39	36	9.40297	49	0.59703	9.41733	51	0.58267	0.01435		9.98565	24	21
40	40	9.40346	48	0.59654	9.41784	52	0.58216	0.01439		9.98561	20	20
41	44	9.40394	48	0.59606	9.41836	51	0.58164	0.01442		9.98558	16	19
42	48	9.40442	48	0.59558	9.41887	52	0.58113	0.01445		9.98555	12	18
43	52	9.40490	48	0.59510	9.41939	51	0.58061	0.01449		9.98551	8	17
44	56	9.40538	48	0.59462	9.41990	51	0.58010	0.01452		9.98548	4	16
45	59	9.40586	48	0.59414	9.42041	52	0.57959	0.01455		9.98545	1	15
46	4	9.40634	48	0.59366	9.42093	51	0.57907	0.01459		9.98541	56	14
47	8	9.40682	48	0.59318	9.42144	51	0.57856	0.01462		9.98538	52	13
48	12	9.40730	48	0.59270	9.42195	51	0.57805	0.01465		9.98535	48	12
49	16	9.40778	47	0.59222	9.42246	51	0.57754	0.01469		9.98531	44	11
50	20	9.40825	48	0.59175	9.42297	51	0.57703	0.01472		9.98528	40	10
51	24	9.40873	48	0.59127	9.42348	51	0.57652	0.01475		9.98525	36	9
52	28	9.40921	47	0.59079	9.42399	51	0.57601	0.01479		9.98521	32	8
53	32	9.40968	48	0.59032	9.42450	51	0.57550	0.01482		9.98518	28	7
54	36	9.41016	47	0.58984	9.42501	51	0.57499	0.01485		9.98515	24	6
55	40	9.41063	48	0.58937	9.42552	51	0.57448	0.01489		9.98511	20	5
56	44	9.41111	47	0.58889	9.42603	50	0.57397	0.01492		9.98508	16	4
57	48	9.41158	47	0.58842	9.42653	51	0.57347	0.01495		9.98505	12	3
58	52	9.41205	47	0.58795	9.42704	51	0.57296	0.01499		9.98501	8	2
59	56	9.41252	48	0.58748	9.42755	50	0.57245	0.01502		9.98498	4	1
60	60	9.41300		0.58700	9.42805		0.57195	0.01506		9.98494	0	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 5h	′ 75°

P. p.

″	50	54
10	8	9
20	17	18
30	25	27
40	33	36
50	42	45
6	5	5
7	6	6
8	7	7
9	8	8
″	49	53
10	8	9
20	16	18
30	25	27
40	33	35
50	41	44
6	5	5
7	6	6
8	7	7
9	7	8
″	48	52
10	8	9
20	16	17
30	24	26
40	32	35
50	40	43
6	5	5
7	6	6
8	6	7
9	7	8
″	47	51
10	8	9
20	16	17
30	24	26
40	31	34
50	39	43
6	5	5
7	5	6
8	6	7
9	7	8

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Logarithmos das linhas trigonometricas

T. 26)

15° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	●	9.41300	47	0.58700	9.42805	51	0.57195	0.01506		9.98494	●●	60
1	4	9.41347	47	0.58653	9.42856	50	0.57144	0.01509		9.98491	56	59
2	8	9.41394	47	0.58606	9.42906	51	0.57094	0.01512		9.98488	52	58
3	12	9.41441	47	0.58559	9.42957	50	0.57043	0.01516		9.98484	48	57
4	16	9.41488	47	0.58512	9.43007	50	0.56993	0.01519		9.98481	44	56
5	20	9.41535	47	0.58465	9.43057	51	0.56943	0.01523		9.98477	40	55
6	24	9.41582	46	0.58418	9.43108	50	0.56892	0.01526		9.98474	36	54
7	28	9.41628	47	0.58372	9.43158	50	0.56842	0.01529		9.98471	32	53
8	32	9.41675	47	0.58325	9.43208	50	0.56792	0.01533		9.98467	28	52
9	36	9.41722	46	0.58278	9.43258	50	0.56742	0.01536		9.98464	24	51
10	40	9.41768	47	0.58232	9.43308	50	0.56692	0.01540		9.98460	20	50
11	44	9.41815	46	0.58185	9.43358	50	0.56642	0.01543		9.98457	16	49
12	48	9.41861	47	0.58139	9.43408	50	0.56592	0.01547		9.98453	12	48
13	52	9.41908	46	0.58092	9.43458	50	0.56542	0.01550		9.98450	8	47
14	56	9.41954	47	0.58046	9.43508	50	0.56492	0.01553		9.98447	4	46
15	1	9.42001	46	0.57999	9.43558	49	0.56442	0.01557		9.98443	5●	45
16	4	9.42047	46	0.57953	9.43607	50	0.56393	0.01560		9.98440	56	44
17	8	9.42093	47	0.57907	9.43657	50	0.56343	0.01564		9.98436	52	43
18	12	9.42140	46	0.57860	9.43707	49	0.56293	0.01567		9.98433	48	42
19	16	9.42186	46	0.57814	9.43756	50	0.56244	0.01571		9.98429	44	41
20	20	9.42232	46	0.57768	9.43806	49	0.56194	0.01574		9.98426	40	40
21	24	9.42278	46	0.57722	9.43855	50	0.56145	0.01578		9.98422	36	39
22	28	9.42324	46	0.57676	9.43905	49	0.56095	0.01581		9.98419	32	38
23	32	9.42370	46	0.57630	9.43954	50	0.56046	0.01585		9.98415	28	37
24	36	9.42416	45	0.57584	9.44004	49	0.55996	0.01588		9.98412	24	36
25	40	9.42461	46	0.57539	9.44053	49	0.55947	0.01591		9.98409	20	35
26	44	9.42507	46	0.57493	9.44102	49	0.55898	0.01595		9.98405	16	34
27	48	9.42553	46	0.57447	9.44151	50	0.55849	0.01598		9.98402	12	33
28	52	9.42599	45	0.57401	9.44201	49	0.55799	0.01602		9.98398	8	32
29	56	9.42644	46	0.57356	9.44250	49	0.55750	0.01605		9.98395	4	31
30	2	9.42690	45	0.57310	9.44299	49	0.55701	0.01609		9.98391	5●	30
31	4	9.42735	46	0.57265	9.44348	49	0.55652	0.01612		9.98388	56	29
32	8	9.42781	45	0.57219	9.44397	49	0.55603	0.01616		9.98384	52	28
33	12	9.42826	46	0.57174	9.44446	49	0.55554	0.01619		9.98381	48	27
34	16	9.42872	45	0.57128	9.44495	49	0.55505	0.01623		9.98377	44	26
35	20	9.42917	45	0.57083	9.44544	48	0.55456	0.01627		9.98373	40	25
36	24	9.42962	46	0.57038	9.44592	49	0.55408	0.01630		9.98370	36	24
37	28	9.43008	45	0.56992	9.44641	49	0.55359	0.01634		9.98366	32	23
38	32	9.43053	45	0.56947	9.44690	48	0.55310	0.01637		9.98363	28	22
39	36	9.43098	45	0.56902	9.44738	49	0.55262	0.01641		9.98359	24	21
40	40	9.43143	45	0.56857	9.44787	49	0.55213	0.01644		9.98356	20	20
41	44	9.43188	45	0.56812	9.44836	48	0.55164	0.01648		9.98352	16	19
42	48	9.43233	45	0.56767	9.44884	49	0.55116	0.01651		9.98349	12	18
43	52	9.43278	45	0.56722	9.44933	48	0.55067	0.01655		9.98345	8	17
44	56	9.43323	44	0.56677	9.44981	48	0.55019	0.01658		9.98342	4	16
45	3	9.43367	45	0.56633	9.45029	49	0.54971	0.01662		9.98338	57	15
46	4	9.43412	45	0.56588	9.45078	48	0.54922	0.01666		9.98334	56	14
47	8	9.43457	45	0.56543	9.45126	48	0.54874	0.01669		9.98331	52	13
48	12	9.43502	44	0.56498	9.45174	48	0.54826	0.01673		9.98327	48	12
49	16	9.43546	45	0.56454	9.45222	49	0.54778	0.01676		9.98324	44	11
50	20	9.43591	44	0.56409	9.45271	48	0.54729	0.01680		9.98320	40	10
51	24	9.43635	45	0.56365	9.45319	48	0.54681	0.01683		9.98317	36	9
52	28	9.43680	44	0.56320	9.45367	48	0.54633	0.01687		9.98313	32	8
53	32	9.43724	45	0.56276	9.45415	48	0.54585	0.01691		9.98309	28	7
54	36	9.43769	44	0.56231	9.45463	48	0.54537	0.01694		9.98306	24	6
55	40	9.43813	44	0.56187	9.45511	48	0.54489	0.01698		9.98302	20	5
56	44	9.43857	44	0.56143	9.45559	47	0.54441	0.01701		9.98299	16	4
57	48	9.43901	45	0.56099	9.45606	48	0.54394	0.01705		9.98295	12	3
58	52	9.43946	44	0.56054	9.45654	48	0.54346	0.01709		9.98291	8	2
59	56	9.43990	44	0.56010	9.45702	48	0.54298	0.01712		9.98288	4	1
60	4	9.44034		0.55966	9.45750		0.54250	0.01716		9.98284	5●	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 74°

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Logarithmos das linhas trigonometricas

T. 26)

16° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	4	9.44034	44	0.55966	9.45750	47	0.54250	0.01716		9.98284	56	60
1	4	9.44078	44	0.55922	9.45797	48	0.54203	0.01719		9.98281	56	59
2	8	9.44122	44	0.55878	9.45845	47	0.54155	0.01723		9.98277	52	58
3	12	9.44166	44	0.55834	9.45892	48	0.54108	0.01727		9.98273	48	57
4	16	9.44210	43	0.55790	9.45940	47	0.54060	0.01730		9.98270	44	56
5	20	9.44253	44	0.55747	9.45987	48	0.54013	0.01734		9.98266	40	55
6	24	9.44297	44	0.55703	9.46035	47	0.53965	0.01738		9.98262	36	54
7	28	9.44341	44	0.55659	9.46082	48	0.53918	0.01741		9.98259	32	53
8	32	9.44385	43	0.55615	9.46130	47	0.53870	0.01745		9.98255	28	52
9	36	9.44428	44	0.55572	9.46177	47	0.53823	0.01749		9.98251	24	51
10	40	9.44472	44	0.55528	9.46224	47	0.53776	0.01752		9.98248	20	50
11	44	9.44516	43	0.55484	9.46271	48	0.53729	0.01756		9.98244	16	49
12	48	9.44559	43	0.55441	9.46319	47	0.53681	0.01760		9.98240	12	48
13	52	9.44602	44	0.55398	9.46366	47	0.53634	0.01763		9.98237	8	47
14	56	9.44646	43	0.55354	9.46413	47	0.53587	0.01767		9.98233	4	46
15	5	9.44689	44	0.55311	9.46460	47	0.53540	0.01771		9.98229	55	45
16	4	9.44733	43	0.55267	9.46507	47	0.53493	0.01774		9.98226	56	44
17	8	9.44776	43	0.55224	9.46554	47	0.53446	0.01778		9.98222	52	43
18	12	9.44819	43	0.55181	9.46601	47	0.53399	0.01782		9.98218	48	42
19	16	9.44862	43	0.55138	9.46648	46	0.53352	0.01785		9.98215	44	41
20	20	9.44905	43	0.55095	9.46694	47	0.53306	0.01789		9.98211	40	40
21	24	9.44948	44	0.55052	9.46741	47	0.53259	0.01793		9.98207	36	39
22	28	9.44992	43	0.55008	9.46788	47	0.53212	0.01796		9.98204	32	38
23	32	9.45035	42	0.54965	9.46835	46	0.53165	0.01800		9.98200	28	37
24	36	9.45077	43	0.54923	9.46881	47	0.53119	0.01804		9.98196	24	36
25	40	9.45120	43	0.54880	9.46928	47	0.53072	0.01808		9.98192	20	35
26	44	9.45163	43	0.54837	9.46975	46	0.53025	0.01811		9.98189	16	34
27	48	9.45206	43	0.54794	9.47021	47	0.52979	0.01815		9.98185	12	33
28	52	9.45249	43	0.54751	9.47068	46	0.52932	0.01819		9.98181	8	32
29	56	9.45292	42	0.54708	9.47114	46	0.52886	0.01823		9.98177	4	31
30	0	9.45334	43	0.54666	9.47160	47	0.52840	0.01826		9.98174	54	30
31	4	9.45377	42	0.54623	9.47207	46	0.52793	0.01830		9.98170	56	29
32	8	9.45419	43	0.54581	9.47253	46	0.52747	0.01834		9.98166	52	28
33	12	9.45462	42	0.54538	9.47299	47	0.52701	0.01838		9.98162	48	27
34	16	9.45504	43	0.54496	9.47346	46	0.52654	0.01841		9.98159	44	26
35	20	9.45547	42	0.54453	9.47392	46	0.52608	0.01845		9.98155	40	25
36	24	9.45589	43	0.54411	9.47438	46	0.52562	0.01849		9.98151	36	24
37	28	9.45632	42	0.54368	9.47484	46	0.52516	0.01853		9.98147	32	23
38	32	9.45674	42	0.54326	9.47530	46	0.52470	0.01856		9.98144	28	22
39	36	9.45716	42	0.54284	9.47576	46	0.52424	0.01860		9.98140	24	21
40	40	9.45758	43	0.54242	9.47622	46	0.52378	0.01864		9.98136	20	20
41	44	9.45801	42	0.54199	9.47668	46	0.52332	0.01868		9.98132	16	19
42	48	9.45843	42	0.54157	9.47714	46	0.52286	0.01871		9.98129	12	18
43	52	9.45885	42	0.54115	9.47760	46	0.52240	0.01875		9.98125	8	17
44	56	9.45927	42	0.54073	9.47806	46	0.52194	0.01879		9.98121	4	16
45	7	9.45969	42	0.54031	9.47852	45	0.52148	0.01883		9.98117	53	15
46	4	9.46011	42	0.53989	9.47897	46	0.52103	0.01887		9.98113	56	14
47	8	9.46053	42	0.53947	9.47943	46	0.52057	0.01890		9.98110	52	13
48	12	9.46095	41	0.53905	9.47989	46	0.52011	0.01894		9.98106	48	12
49	16	9.46136	42	0.53864	9.48035	45	0.51965	0.01898		9.98102	44	11
50	20	9.46178	42	0.53822	9.48080	46	0.51920	0.01902		9.98098	40	10
51	24	9.46220	42	0.53780	9.48126	45	0.51874	0.01906		9.98094	36	9
52	28	9.46262	41	0.53738	9.48171	46	0.51829	0.01910		9.98090	32	8
53	32	9.46303	42	0.53697	9.48217	45	0.51783	0.01913		9.98087	28	7
54	36	9.46345	41	0.53655	9.48262	45	0.51738	0.01917		9.98083	24	6
55	40	9.46386	42	0.53614	9.48307	46	0.51693	0.01921		9.98079	20	5
56	44	9.46428	41	0.53572	9.48353	45	0.51647	0.01925		9.98075	16	4
57	48	9.46469	42	0.53531	9.48398	45	0.51602	0.01929		9.98071	12	3
58	52	9.46511	41	0.53489	9.48443	46	0.51557	0.01933		9.98067	8	2
59	56	9.46552	42	0.53448	9.48489	45	0.51511	0.01937		9.98063	4	1
60	0	9.46594		0.53406	9.48534		0.51466	0.01940		9.98060	50	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 73°

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Logarithmos das linhas trigonometricas

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17° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	0	9.46594	41	0.53406	9.48534	45	0.51466	0.01940		9.98060	58	60
1	4	9.46635	41	0.53365	9.48579	45	0.51421	0.01944		9.98056	56	59
2	8	9.46676	41	0.53324	9.48624	45	0.51376	0.01948		9.98052	52	58
3	12	9.46717	41	0.53283	9.48669	45	0.51331	0.01952		9.98048	48	57
4	16	9.46758	42	0.53242	9.48714	45	0.51286	0.01956		9.98044	44	56
5	20	9.46800	41	0.53200	9.48759	45	0.51241	0.01960		9.98040	40	55
6	24	9.46841	41	0.53159	9.48804	45	0.51196	0.01964		9.98036	36	54
7	28	9.46882	41	0.53118	9.48849	45	0.51151	0.01968		9.98032	32	53
8	32	9.46923	41	0.53077	9.48894	45	0.51106	0.01971		9.98029	28	52
9	36	9.46964	41	0.53036	9.48939	45	0.51061	0.01975		9.98025	24	51
10	40	9.47005	40	0.52995	9.48984	45	0.51016	0.01979		9.98021	20	50
11	44	9.47045	41	0.52955	9.49029	44	0.50971	0.01983		9.98017	16	49
12	48	9.47086	41	0.52914	9.49073	45	0.50927	0.01987		9.98013	12	48
13	52	9.47127	41	0.52873	9.49118	45	0.50882	0.01991		9.98009	8	47
14	56	9.47168	41	0.52832	9.49163	44	0.50837	0.01995		9.98005	4	46
15	0	9.47209	40	0.52791	9.49207	45	0.50793	0.01999		9.98001	57	45
16	4	9.47249	41	0.52751	9.49252	44	0.50748	0.02003		9.97997	56	44
17	8	9.47290	40	0.52710	9.49296	45	0.50704	0.02007		9.97993	52	43
18	12	9.47330	41	0.52670	9.49341	44	0.50659	0.02011		9.97989	48	42
19	16	9.47371	40	0.52629	9.49385	45	0.50615	0.02014		9.97986	44	41
20	20	9.47411	41	0.52589	9.49430	44	0.50570	0.02018		9.97982	40	40
21	24	9.47452	40	0.52548	9.49474	45	0.50526	0.02022		9.97978	36	39
22	28	9.47492	41	0.52508	9.49519	44	0.50481	0.02026		9.97974	32	38
23	32	9.47533	40	0.52467	9.49563	44	0.50437	0.02030		9.97970	28	37
24	36	9.47573	40	0.52427	9.49607	45	0.50393	0.02034		9.97966	24	36
25	40	9.47613	41	0.52387	9.49652	44	0.50348	0.02038		9.97962	20	35
26	44	9.47654	40	0.52346	9.49696	44	0.50304	0.02042		9.97958	16	34
27	48	9.47694	40	0.52306	9.49740	44	0.50260	0.02046		9.97954	12	33
28	52	9.47734	40	0.52266	9.49784	44	0.50216	0.02050		9.97950	8	32
29	56	9.47774	40	0.52226	9.49828	44	0.50172	0.02054		9.97946	4	31
30	20	9.47814	40	0.52186	9.49872	44	0.50128	0.02058		9.97942	50	30
31	4	9.47854	40	0.52146	9.49916	44	0.50084	0.02062		9.97938	56	29
32	8	9.47894	40	0.52106	9.49960	44	0.50040	0.02066		9.97934	52	28
33	12	9.47934	40	0.52066	9.50004	44	0.49996	0.02070		9.97930	48	27
34	16	9.47974	40	0.52026	9.50048	44	0.49952	0.02074		9.97926	44	26
35	20	9.48014	40	0.51986	9.50092	44	0.49908	0.02078		9.97922	40	25
36	24	9.48054	40	0.51946	9.50136	44	0.49864	0.02082		9.97918	36	24
37	28	9.48094	39	0.51906	9.50180	43	0.49820	0.02086		9.97914	32	23
38	32	9.48133	40	0.51867	9.50223	44	0.49777	0.02090		9.97910	28	22
39	36	9.48173	40	0.51827	9.50267	44	0.49733	0.02094		9.97906	24	21
40	40	9.48213	39	0.51787	9.50311	44	0.49689	0.02098		9.97902	20	20
41	44	9.48252	40	0.51748	9.50355	43	0.49645	0.02102		9.97898	16	19
42	48	9.48292	40	0.51708	9.50398	44	0.49602	0.02106		9.97894	12	18
43	52	9.48332	39	0.51668	9.50442	43	0.49558	0.02110		9.97890	8	17
44	56	9.48371	40	0.51629	9.50485	44	0.49515	0.02114		9.97886	4	16
45	21	9.48411	39	0.51589	9.50529	43	0.49471	0.02118		9.97882	49	15
46	4	9.48450	40	0.51550	9.50572	44	0.49428	0.02122		9.97878	56	14
47	8	9.48490	39	0.51510	9.50616	43	0.49384	0.02126		9.97874	52	13
48	12	9.48529	39	0.51471	9.50659	44	0.49341	0.02130		9.97870	48	12
49	16	9.48568	39	0.51432	9.50703	43	0.49297	0.02134		9.97866	44	11
50	20	9.48607	40	0.51393	9.50746	43	0.49254	0.02139		9.97861	40	10
51	24	9.48647	39	0.51353	9.50789	44	0.49211	0.02143		9.97857	36	9
52	28	9.48686	39	0.51314	9.50833	43	0.49167	0.02147		9.97853	32	8
53	32	9.48725	39	0.51275	9.50876	43	0.49124	0.02151		9.97849	28	7
54	36	9.48764	39	0.51236	9.50919	43	0.49081	0.02155		9.97845	24	6
55	40	9.48803	39	0.51197	9.50962	43	0.49038	0.02159		9.97841	20	5
56	44	9.48842	39	0.51158	9.51005	43	0.48995	0.02163		9.97837	16	4
57	48	9.48881	39	0.51119	9.51048	44	0.48952	0.02167		9.97833	12	3
58	52	9.48920	39	0.51080	9.51092	43	0.48908	0.02171		9.97829	8	2
59	56	9.48959	39	0.51041	9.51135	43	0.48865	0.02175		9.97825	4	1
60	22	9.48998		0.51002	9.51178		0.48822	0.02179		9.97821	48	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 72°

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Logarithmos das linhas trigonometricas

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18° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	12	9.48998	39	0.51002	9.51178	43	0.48822	0.02179		9.97821	48	60
1	4	9.49037	39	0.50963	9.51221	43	0.48779	0.02183		9.97817	56	59
2	8	9.49076	39	0.50924	9.51264	42	0.48736	0.02188		9.97812	52	58
3	12	9.49115	38	0.50885	9.51306	43	0.48694	0.02192		9.97808	48	57
4	16	9.49153	39	0.50847	9.51349	43	0.48651	0.02196		9.97804	44	56
5	20	9.49192	39	0.50808	9.51392	43	0.48608	0.02200		9.97800	40	55
6	24	9.49231	38	0.40769	9.51435	43	0.48565	0.02204		9.97796	36	54
7	28	9.49269	39	0.50731	9.51478	42	0.48522	0.02208		9.97792	32	53
8	32	9.49308	39	0.50692	9.51520	43	0.48480	0.02212		9.97788	28	52
9	36	9.49347	38	0.50653	9.51563	43	0.48437	0.02216		9.97784	24	51
10	40	9.49385	39	0.50615.	9.51606	42	0.48394	0.02221		9.97779	20	50
11	44	9.49424	38	0.50576	9.51648	43	0.48352	0.02225		9.97775	16	49
12	48	9.49462	38	0.50538	9.51691	43	0.48309	0.02229		9.97771	12	48
13	52	9.49500	39	0.50500	9.51734	42	0.48266	0.02233		9.97767	8	47
14	56	9.49539	38	0.50461	9.51776	43	0.48224	0.02237		9.97763	4	46
15	12	9.49577	38	0.50423	9.51819	42	0.48181	0.02241		9.97759	47	45
16	4	9.49615	39	0.50385	9.51861	42	0.48139	0.02246		9.97754	56	44
17	8	9.49654	38	0.50346	9.51903	43	0.48097	0.02250		9.97750	52	43
18	12	9.49692	38	0 50308	9.51946	42	0.48054	0.02254		9.97746	48	42
19	16	9.49730	38	0.50270	9.51988	43	0.48012	0.02258		9.97742	44	41
20	20	9.49768	38	0.50232	9.52031	42	0.47969	0.02262		9.97738	40	40
21	24	9.49806	38	0.50194	9.52073	42	0.47927	0.02266		9.97734	36	39
22	28	9.49844	38	0.50156	9.52115	42	0.47885	0.02271		9.97729	32	38
23	32	9.49882	38	0.50118	9.52157	43	0.47843	0.02275		9.97725	28	37
24	36	9.49920	38	0.50080	9.52200	42	0.47800	0.02279		9.97721	24	36
25	40	9.49958	38	0.50042	9.52242	42	0.47758	0.02283		9.97717	20	35
26	44	9.49996	38	0.50004	9.52284	42	0.47716	0.02287		9.97713	16	34
27	48	9.50034	38	0.49966	9.52326	42	0.47674	0.02292		9.97708	12	33
28	52	9.50072	38	0.49928	9.52368	42	0.47632	0.02296		9.97704	8	32
29	56	9.50110	38	0.49890	9.52410	42	0.47590	0.02300		9.97700	4	31
30	14	9.50148	37	0.49852	9.52452	42	0.47548	0.02304		9.97696	46	30
31	4	9.50185	38	0.49815	9.52494	42	0.47506	0.02309		9.97691	56	29
32	8	9.50223	38	0.49777	9.52536	42	0.47464	0.02313		9.97687	52	28
33	12	9.50261	37	0.49739	9.52578	42	0.47422	0.02317		9.97683	48	27
34	16	9.50298	38	0.49702	9.52620	41	0.47380	0.02321		9.97679	44	26
35	20	9.50336	38	0.49664	9.52661	42	0.47339	0.02326		9.97674	40	25
36	24	9.50374	37	0.49626	9.52703	42	0.47297	0.02330		9.97670	36	24
37	28	9.50411	38	0.49589	9.52745	42	0.47255	0.02334		9.97666	32	23
38	32	9.50449	37	0.49551	9.52787	42	0.47213	0.02338		9.97662	28	22
39	36	9.50486	37	0.49514	9.52829	41	0.47171	0.02343		9.97657	24	21
40	40	9.50523	38	0.49477	9.52870	42	0.47130	0.02347		9.97653	20	20
41	44	9.50561	37	0.49439	9.52912	41	0.47088	0.02351		9.97649	16	19
42	48	9.50598	37	0.49402	9.52953	42	0.47047	0.02355		9.97645	12	18
43	52	9.50635	38	0.49365	9.52995	42	0.47005	0.02360		9.97640	8	17
44	56	9.50673	37	0.49327	9.53037	41	0.46963	0.02364		9.97636	4	16
45	15	9.50710	37	0.49290	9.53078	42	0 46922	0.02368		9.97632	45	15
46	4	9.50747	37	0.49253	9.53120	41	0.46880	0.02372		9.97628	56	14
47	8	9.50784	37	0.49216	9.53161	41	0.46839	0.02377		9.97623	52	13
48	12	9.50821	37	0.49179	9.53202	42	0.46798	0.02381		9.97619	48	12
49	16	9.50858	38	0.49142	9.53244	41	0.46756	0.02385		9.97615	44	11
50	20	9.50896	37	0.49104	9.53285	42	0.46715	0.02390		9.97610	40	10
51	24	9.50933	37	0.49067	9.53327	41	0.46673	0.02394		9.97606	36	9
52	28	9.50970	37	0.49030	9.53368	41	0.46632	0.02398		9.97602	32	8
53	32	9.51007	36	0.48993	9.53409	41	0.46591	0.02403		9.97597	28	7
54	36	9.51043	37	0.48957	9.53450	42	0.46550	0.02407		9.97593	24	6
55	40	9.51080	37	0.48920	9.53492	41	0.46508	0.02411		9.97589	20	5
56	44	9.51117	37	0.48883	9.53533	41	0.46467	0.02416		9.97584	16	4
57	48	9.51154	37	0.48846	9.53574	41	0.46426	0.02420		9.97580	12	3
58	52	9.51191	36	0.48809	9.53615	41	0.46385	0.02424		9.97576	8	2
59	56	9.51227	37	0.48773	9.53656	41	0.46344	0.02429		9.97571	4	1
60	16	9.51264		0.48736	9.53697		0.46303	0.02433		9.97567	44	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s.	′
											4h	71°

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Logarithmos das linhas trigonometricas

T. 26)

19° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	16	9.51264	37	0.48736	9.53697	41	0.46303	0.02433	4	9.97567	44	60
1	4	9.51301	37	0.48699	9.53738	41	0.46262	0.02437	5	9.97563	56	59
2	8	9.51338	36	0.48662	9.53779	41	0.46221	0.02442	4	9.97558	52	58
3	12	9.51374	37	0.48626	9.53820	41	0.46180	0.02446	4	9.97554	48	57
4	16	9.51411	36	0.48589	9.53861	41	0.46139	0.02450	5	9.97550	44	56
5	20	9.51447	37	0.48553	9.53902	41	0.46098	0.02455	4	9.97545	40	55
6	24	9.51484	36	0.48516	9.53943	41	0.46057	0.02459	5	9.97541	36	54
7	28	9.51520	37	0.48480	9.53984	41	0.46016	0.02464	4	9.97536	32	53
8	32	9.51557	36	0.48443	9.54025	40	0.45975	0.02468	4	9.97532	28	52
9	36	9.51593	36	0.48407	9.54065	41	0.45935	0.02472	5	9.97528	24	51
10	40	9.51629	37	0.48371	9.54106	41	0.45894	0.02477	4	9.97523	20	50
11	44	9.51666	36	0.48334	9.54147	40	0.45853	0.02481	4	9.97519	16	49
12	48	9.51702	36	0.48298	9.54187	41	0.45813	0.02485	5	9.97515	12	48
13	52	9.51738	36	0.48262	9.54228	41	0.45772	0.02490	4	9.97510	8	47
14	56	9.51774	37	0.48226	9.54269	40	0.45731	0.02494	5	9.97506	4	46
15	17	9.51811	36	0.48189	9.54309	41	0.45691	0.02499	4	9.97501	43	45
16	4	9.51847	36	0.48153	9.54350	40	0.45650	0.02503	5	9.97497	56	44
17	8	9.51883	36	0.48117	9.54390	41	0.45610	0.02508	4	9.97492	52	43
18	12	9.51919	36	0.48081	9.54431	40	0.45569	0.02512	4	9.97488	48	42
19	16	9.51955	36	0.48045	9.54471	41	0.45529	0.02516	5	9.97484	44	41
20	20	9.51991	36	0.48009	9.54512	40	0.45488	0.02521	4	9.97479	40	40
21	24	9.52027	36	0.47973	9.54552	41	0.45448	0.02525	5	9.97475	36	39
22	28	9.52063	36	0.47937	9.54593	40	0.45407	0.02530	4	9.97470	32	38
23	32	9.52099	36	0.47901	9.54633	40	0.45367	0.02534	5	9.97466	28	37
24	36	9.52135	36	0.47865	9.54673	41	0.45327	0.02539	4	9.97461	24	36
25	40	9.52171	36	0.47829	9.54714	40	0.45286	0.02543	4	9.97457	20	35
26	44	9.52207	35	0.47793	9.54754	40	0.45246	0.02547	5	9.97453	16	34
27	48	9.52242	36	0.47758	9.54794	41	0.45206	0.02552	4	9.97448	12	33
28	52	9.52278	36	0.47722	9.54835	40	0.45165	0.02556	5	9.97444	8	32
29	56	9.52314	36	0.47686	9.54875	40	0.45125	0.02561	4	9.97439	4	31
30	18	9.52350	35	0.47650	9.54915	40	0.45085	0.02565	5	9.97435	42	30
31	4	9.52385	36	0.47615	9.54955	40	0.45045	0.02570	4	9.97430	56	29
32	8	9.52421	35	0.47579	9.54995	40	0.45005	0.02574	5	9.97426	52	28
33	12	9.52456	36	0.47544	9.55035	40	0.44965	0.02579	4	9.97421	48	27
34	16	9.52492	35	0.47508	9.55075	40	0.44925	0.02583	5	9.97417	44	26
35	20	9.52527	36	0.47473	9.55115	40	0.44885	0.02588	4	9.97412	40	25
36	24	9.52563	35	0.47437	9.55155	40	0.44845	0.02592	5	9.97408	36	24
37	28	9.52598	36	0.47402	9.55195	40	0.44805	0.02597	4	9.97403	32	23
38	32	9.52634	35	0.47366	9.55235	40	0.44765	0.02601	5	9.97399	28	22
39	36	9.52669	36	0.47331	9.55275	40	0.44725	0.02606	4	9.97394	24	21
40	40	9.52705	35	0.47295	9.55315	40	0.44685	0.02610	5	9.97390	20	20
41	44	9.52740	35	0.47260	9.55355	40	0.44645	0.02615	4	9.97385	16	19
42	48	9.52775	36	0.47225	9.55395	39	0.44605	0.02619	5	9.97381	12	18
43	52	9.52811	35	0.47189	9.55434	40	0.44566	0.02624	4	9.97376	8	17
44	56	9.52846	35	0.47154	9.55474	40	0.44526	0.02628	5	9.97372	4	16
45	19	9.52881	35	0.47119	9.55514	40	0.44486	0.02633	4	9.97367	41	15
46	4	9.52916	35	0.47084	9.55554	39	0.44446	0.02637	5	9.97363	56	14
47	8	9.52951	35	0.47049	9.55593	40	0.44407	0.02642	5	9.97358	52	13
48	12	9.52986	35	0.47014	9.55633	40	0.44367	0.02647	4	9.97353	48	12
49	16	9.53021	35	0.46979	9.55673	39	0.44327	0.02651	5	9.97349	44	11
50	20	9.53056	36	0.46944	9.55712	40	0.44288	0.02656	4	9.97344	40	10
51	24	9.53092	34	0.46908	9.55752	39	0.44248	0.02660	5	9.97340	36	9
52	28	9.53126	35	0.46874	9.55791	40	0.44209	0.02665	4	9.97335	32	8
53	32	9.53161	35	0.46839	9.55831	39	0.44169	0.02669	5	9.97331	28	7
54	36	9.53196	35	0.46804	9.55870	40	0.44130	0.02674	4	9.97326	24	6
55	40	9.53231	35	0.46769	9.55910	39	0.44090	0.02678	5	9.97322	20	5
56	44	9.53266	35	0.46734	9.55949	40	0.44051	0.02683	5	9.97317	16	4
57	48	9.53301	35	0.46699	9.55989	39	0.44011	0.02688	4	9.97312	12	3
58	52	9.53336	34	0.46664	9.56028	39	0.43972	0.02692	5	9.97308	8	2
59	56	9.53370	35	0.46630	9.56067	40	0.43933	0.02697	4	9.97303	4	1
60	20	9.53405		0.46595	9.56107		0.43893	0.02701		9.97299	40	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 70°

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30	19	21	21
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7	4	5	5
8	5	5	5
9	6	6	6

	″	36	40
10	6	7	7
20	12	13	13
30	18	20	20
40	24	27	27
50	30	33	33
6	4	4	4
7	4	5	5
8	5	5	5
9	5	6	6

	″	35	39
10	6	7	7
20	12	13	13
30	18	20	20
40	23	26	26
50	29	33	33
6	4	4	4
7	4	5	5
8	5	5	5
9	5	6	6

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Logarithmos das linhas trigonometricas

T. 26)

20° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	36	9.53405	35	0.46595	9.56107	39	0.43893	0.02701	5	9.97299	46	60
1	4	9.53440	35	0.46560	9.56146	39	0.43854	0.02706	5	9.97294	56	59
2	8	9.53475	34	0.46525	9.56185	39	0.43815	0.02711	4	9.97289	52	58
3	12	9.53509	35	0.46491	9.56224	40	0.43776	0.02715	5	9.97285	48	57
4	16	9.53544	34	0.46456	9.56264	39	0.43736	0.02720	4	9.97280	44	56
5	20	9.53578	35	0.46422	9.56303	39	0.43697	0.02724	5	9.97276	40	55
6	24	9.53613	34	0.46387	9.56342	39	0.43658	0.02729	5	9.97271	36	54
7	28	9.53647	35	0.46353	9.56381	39	0.43619	0.02734	4	9.97266	32	53
8	32	9.53682	34	0.46318	9.56420	39	0.43580	0.02738	5	9.97262	28	52
9	36	9.53716	35	0.46284	9.56459	39	0.43541	0.02743	5	9.97257	24	51
10	40	9.53751	34	0.46249	9.56498	39	0.43502	0.02748	4	9.97252	20	50
11	44	9.53785	34	0.46215	9.56537	39	0.43463	0.02752	5	9.97248	16	49
12	48	9.53819	35	0.46181	9.56576	39	0.43424	0.02757	5	9.97243	12	48
13	52	9.53854	34	0.46146	9.56615	39	0.43385	0.02762	4	9.97238	8	47
14	56	9.53888	34	0.46112	9.56654	39	0.43346	0.02766	5	9.97234	4	46
15	38	9.53922	35	0.46078	9.56693	39	0.43307	0.02771	5	9.97229	39	45
16	4	9.53957	34	0.46043	9.56732	39	0.43268	0.02776	4	9.97224	56	44
17	8	9.53991	34	0.46009	9.56771	39	0.43229	0.02780	5	9.97220	52	43
18	12	9.54025	34	0.45975	9.56810	39	0.43190	0.02785	5	9.97215	48	42
19	16	9.54059	34	0.45941	9.56849	38	0.43151	0.02790	4	9.97210	44	41
20	20	9.54093	34	0.45907	9.56887	39	0.43113	0.02794	5	9.97206	40	40
21	24	9.54127	34	0.45873	9.56926	39	0.43074	0.02799	5	9.97201	36	39
22	28	9.54161	34	0.45839	9.56965	39	0.43035	0.02804	4	9.97196	32	38
23	32	9.54195	34	0.45805	9.57004	38	0.42996	0.02808	5	9.97192	28	37
24	36	9.54229	34	0.45771	9.57042	39	0.42958	0.02813	5	9.97187	24	36
25	40	9.54263	34	0.45737	9.57081	39	0.42919	0.02818	4	9.97182	20	35
26	44	9.54297	34	0.45703	9.57120	38	0.42880	0.02822	5	9.97178	16	34
27	48	9.54331	34	0.45669	9.57158	39	0.42842	0.02827	5	9.97173	12	33
28	52	9.54365	34	0.45635	9.57197	38	0.42803	0.02832	5	9.97168	8	32
29	56	9.54399	34	0.45601	9.57235	39	0.42765	0.02837	4	9.97163	4	31
30	39	9.54433	33	0.45567	9.57274	38	0.42726	0.02841	5	9.97159	39	30
31	4	9.54466	34	0.45534	9.57312	39	0.42688	0.02846	5	9.97154	56	29
32	8	9.54500	34	0.45500	9.57351	38	0.42649	0.02851	4	9.97149	52	28
33	12	9.54534	33	0.45466	9.57389	39	0.42611	0.02855	5	9.97145	48	27
34	16	9.54567	34	0.45433	9.57428	38	0.42572	0.02860	5	9.97140	44	26
35	20	9.54601	34	0.45399	9.57466	38	0.42534	0.02865	5	9.97135	40	25
36	24	9.54635	33	0.45365	9.57504	39	0.42496	0.02870	4	9.97130	36	24
37	28	9.54668	34	0.45332	9.57543	38	0.42457	0.02874	5	9.97126	32	23
38	32	9.54702	33	0.45298	9.57581	38	0.42419	0.02879	5	9.97121	28	22
39	36	9.54735	34	0.45265	9.57619	39	0.42381	0.02884	5	9.97116	24	21
40	40	9.54769	33	0.45231	9.57658	38	0.42342	0.02889	4	9.97111	20	20
41	44	9.54802	34	0.45198	9.57696	38	0.42304	0.02893	5	9.97107	16	19
42	48	9.54836	33	0.45164	9.57734	38	0.42266	0.02898	5	9.97102	12	18
43	52	9.54869	34	0.45131	9.57772	38	0.42228	0.02903	5	9.97097	8	17
44	56	9.54903	33	0.45097	9.57810	39	0.42190	0.02908	5	9.97092	4	16
45	42	9.54936	33	0.45064	9.57849	38	0.42151	0.02913	4	9.97087	37	15
46	4	9.54969	34	0.45031	9.57887	38	0.42113	0.02917	5	9.97083	56	14
47	8	9.55003	33	0.44997	9.57925	38	0.42075	0.02922	5	9.97078	52	13
48	12	9.55036	33	0.44964	9.57963	38	0.42037	0.02927	5	9.97073	48	12
49	16	9.55069	33	0.44931	9.58001	38	0.41999	0.02932	5	9.97068	44	11
50	20	9.55102	34	0.44898	9.58039	38	0.41961	0.02937	4	9.97063	40	10
51	24	9.55136	33	0.44864	9.58077	38	0.41923	0.02941	5	9.97059	36	9
52	28	9.55169	33	0.44831	9.58115	38	0.41885	0.02946	5	9.97054	32	8
53	32	9.55202	33	0.44798	9.58153	38	0.41847	0.02951	5	9.97049	28	7
54	36	9.55235	33	0.44765	9.58191	38	0.41809	0.02956	5	9.97044	24	6
55	40	9.55268	33	0.44732	9.58229	38	0.41771	0.02961	4	9.97039	20	5
56	44	9.55301	33	0.44699	9.58267	37	0.41733	0.02965	5	9.97035	16	4
57	48	9.55334	33	0.44666	9.58304	38	0.41696	0.02970	5	9.97030	12	3
58	52	9.55367	33	0.44633	9.58342	38	0.41658	0.02975	5	9.97025	8	2
59	56	9.55400	33	0.44600	9.58380	38	0.41620	0.02980	5	9.97020	4	1
60	34	9.55433		0.44567	9.58418		0.41582	0.02985		9.97015	36	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 69°

P. p.

	″ 35	39
10	6	7
20	12	13
30	18	20
40	23	26
50	29	33
6	4	4
7	4	5
8	5	5
9	5	6

	″ 34	38
10	6	6
20	11	13
30	17	19
40	23	25
50	28	32
6	3	4
7	4	4
8	5	5
9	5	6

	″ 33	37
10	6	6
20	11	12
30	17	19
40	22	25
50	28	31
6	3	4
7	4	4
8	4	5
9	5	6

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Logarithmos das linhas trigonometricas.

T. 26)

21° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	24	9.55433	33	0.44567	9.58418	37	0.41582	0.02985	5	9.97015	36	60
1	4	9.55466	33	0.44534	9.58455	38	0.41545	0.02990	5	9.97010	56	59
2	8	9.55499	33	0.44501	9.58493	38	0.41507	0.02995	4	9.97005	52	58
3	12	9.55532	32	0.44468	9.58531	38	0.41469	0.02999	5	9.97001	48	57
4	16	9.55564	33	0.44436	9.58569	37	0.41431	0.03004	5	9.96996	44	56
5	20	9.55597	33	0.44403	9.58606	38	0.41394	0.03009	5	9.96991	40	55
6	24	9.55630	33	0.44370	9.58644	37	0.41356	0.03014	5	9.96986	36	54
7	28	9.55663	32	0.44337	9.58681	38	0.41319	0.03019	5	9.96981	32	53
8	32	9.55695	33	0.44305	9.58719	38	0.41281	0.03024	5	9.96976	28	52
9	36	9.55728	33	0.44272	9.58757	37	0.41243	0.03029	5	9.96971	24	51
10	40	9.55761	32	0.44239	9.58794	38	0.41206	0.03034	4	9.96966	20	50
11	44	9.55793	33	0.44207	9.58832	37	0.41168	0.03038	5	9.96962	16	49
12	48	9.55826	32	0.44174	9.58869	38	0.41131	0.03043	5	9.96957	12	48
13	52	9.55858	33	0.44142	9.58907	37	0.41093	0.03048	5	9.96952	8	47
14	56	9.55891	32	0.44109	9.58944	37	0.41056	0.03053	5	9.96947	4	46
15	25	9.55923	33	0.44077	9.58981	38	0.41019	0.03058	5	9.96942	35	45
16	4	9.55956	32	0.44044	9.59019	37	0.40981	0.03063	5	9.96937	56	44
17	8	9.55988	33	0.44012	9.59056	38	0.40944	0.03068	5	9.96932	52	43
18	12	9.56021	32	0.43979	9.59094	37	0.40906	0.03073	5	9.96927	48	42
19	16	9.56053	32	0.43947	9.59131	37	0.40869	0.03078	5	9.96922	44	41
20	20	9.56085	33	0.43915	9.59168	37	0.40832	0.03083	5	9.96917	40	40
21	24	9.56118	32	0.43882	9.59205	38	0.40795	0.03088	5	9.96912	36	39
22	28	9.56150	32	0.43850	9.59243	37	0.40757	0.03093	4	9.96907	32	38
23	32	9.56182	33	0.43818	9.59280	37	0.40720	0.03097	5	9.96903	28	37
24	36	9.56215	32	0.43785	9.59317	37	0.40683	0.03102	5	9.96898	24	36
25	40	9.56247	32	0.43753	9.59354	37	0.40646	0.03107	5	9.96893	20	35
26	44	9.56279	32	0.43721	9.59391	38	0.40609	0.03112	5	9.96888	16	34
27	48	9.56311	32	0.43689	9.59429	37	0.40571	0.03117	5	9.96883	12	33
28	52	9.56343	32	0.43657	9.59466	37	0.40534	0.03122	5	9.96878	8	32
29	56	9.56375	33	0.43625	9.59503	37	0.40497	0.03127	5	9.96873	4	31
30	26	9.56408	32	0.43592	9.59540	37	0.40460	0.03132	5	9.96868	34	30
31	4	9.56440	32	0.43560	9.59577	37	0.40423	0.03137	5	9.96863	56	29
32	8	9.56472	32	0.43528	9.59614	37	0.40386	0.03142	5	9.96858	52	28
33	12	9.56504	32	0.43496	9.59651	37	0.40349	0.03147	5	9.96853	48	27
34	16	9.56536	32	0.43464	9.59688	37	0.40312	0.03152	5	9.96848	44	26
35	20	9.56568	31	0.43432	9.59725	37	0.40275	0.03157	5	9.96843	40	25
36	24	9.56599	32	0.43401	9.59762	37	0.40238	0.03162	5	9.96838	36	24
37	28	9.56631	32	0.43369	9.59799	36	0.40201	0.03167	5	9.96833	32	23
38	32	9.56663	32	0.43337	9.59835	37	0.40165	0.03172	5	9.96828	28	22
39	36	9.56695	32	0.43305	9.59872	37	0.40128	0.03177	5	9.96823	24	21
40	40	9.56727	32	0.43273	9.59909	37	0.40091	0.03182	5	9.96818	20	20
41	44	9.56759	31	0.43241	9.59946	37	0.40054	0.03187	5	9.96813	16	19
42	48	9.56790	32	0.43210	9.59983	36	0.40017	0.03192	5	9.96808	12	18
43	52	9.56822	32	0.43178	9.60019	37	0.39981	0.03197	5	9.96803	8	17
44	56	9.56854	32	0.43146	9.60056	37	0.39944	0.03202	5	9.96798	4	16
45	27	9.56886	31	0.43114	9.60093	37	0.39907	0.03207	5	9.96793	33	15
46	4	9.56917	32	0.43083	9.60130	36	0.39870	0.03212	5	9.96788	56	14
47	8	9.56949	31	0.43051	9.60166	37	0.39834	0.03217	5	9.96783	52	13
48	12	9.56980	32	0.43020	9.60203	37	0.39797	0.03222	6	9.96778	48	12
49	16	9.57012	32	0.42988	9.60240	36	0.39760	0.03228	5	9.96772	44	11
50	20	9.57044	31	0.42956	9.60276	37	0.39724	0.03233	5	9.96767	40	10
51	24	9.57075	32	0.42925	9.60313	36	0.39687	0.03238	5	9.96762	36	9
52	28	9.57107	31	0.42893	9.60349	37	0.39651	0.03243	5	9.96757	32	8
53	32	9.57138	31	0.42862	9.60386	36	0.39614	0.03248	5	9.96752	28	7
54	36	9.57169	32	0.42831	9.60422	37	0.39578	0.03253	5	9.96747	24	6
55	40	9.57201	31	0.42799	9.60459	36	0.39541	0.03258	5	9.96742	20	5
56	44	9.57232	32	0.42768	9.60495	37	0.39505	0.03263	5	9.96737	16	4
57	48	9.57264	31	0.42736	9.60532	36	0.39468	0.03268	5	9.96732	12	3
58	52	9.57295	31	0.42705	9.60568	37	0.39432	0.03273	5	9.96727	8	2
59	56	9.57326	32	0.42674	9.60605	36	0.39395	0.03278	5	9.96722	4	1
60	28	9.57358		0.42642	9.60641		0.39359	0.03283		9.96717	32	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 68°

P. p.

	33	38
10	6	6
20	11	13
30	17	19
40	22	25
50	28	32
6	3	4
7	4	4
8	4	5
9	5	6

	4	5
10	1	1
20	1	2
30	2	3
40	3	3
50	3	4
6	0	1
7	0	1
8	1	1
9	1	1

	32	37
10	5	6
20	11	12
30	16	19
40	21	25
50	27	31
6	3	4
7	4	4
8	4	5
9	5	6

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Logarithmos das linhas trigonometricas

T. 26)

22° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	28	9.57358	31	0.42642	9.60641	36	0.39359	0.03283	6	9.96717	32	60
1	4	9.57389	31	0.42611	9.60677	37	0.39323	0.03289	5	9.96711	56	59
2	8	9.57420	31	0.42580	9.60714	36	0.39286	0.03294	5	9.96706	52	58
3	12	9.57451	31	0.42549	9.60750	36	0.39250	0.03299	5	9.96701	48	57
4	16	9.57482	32	0.42518	9.60786	37	0.39214	0.03304	5	9.96696	44	56
5	20	9.57514	31	0.42486	9.60823	36	0.39177	0.03309	5	9.96691	40	55
6	24	9.57545	31	0.42455	9.60859	36	0.39141	0.03314	5	9.96686	36	54
7	28	9.57576	31	0.42424	9.60895	36	0.39105	0.03319	5	9.96681	32	53
8	32	9.57607	31	0.42393	9.60931	36	0.39069	0.03324	6	9.96676	28	52
9	36	9.57638	31	0.42362	9.60967	37	0.39033	0.03330	5	9.96670	24	51
10	40	9.57669	31	0.42331	9.61004	36	0.38996	0.03335	5	9.96665	20	50
11	44	9.57700	31	0.42300	9.61040	36	0.38960	0.03340	5	9.96660	16	49
12	48	9.57731	31	0.42269	9.61076	36	0.38924	0.03345	5	9.96655	12	48
13	52	9.57762	31	0.42238	9.61112	36	0.38888	0.03350	5	9.96650	8	47
14	56	9.57793	31	0.42207	9.61148	36	0.38852	0.03355	5	9.96645	4	46
15	29	9.57824	31	0.42176	9.61184	36	0.38816	0.03360	6	9.96640	31	45
16	4	9.57855	30	0.42145	9.61220	36	0.38780	0.03366	5	9.96634	56	44
17	8	9.57885	31	0.42115	9.61256	36	0.38744	0.03371	5	9.96629	52	43
18	12	9.57916	31	0.42084	9.61292	36	0.38708	0.03376	5	9.96624	48	42
19	16	9.57947	31	0.42053	9.61328	36	0.38972	0.03381	5	9.96619	44	41
20	20	9.57978	30	0.42022	9.61364	36	0.38636	0.03386	6	9.96614	40	40
21	24	9.58008	31	0.41992	9.61400	36	0.38600	0.03392	5	9.96608	36	39
22	28	9.58039	31	0.41961	9.61436	36	0.38564	0.03397	5	9.96603	32	38
23	32	9.58070	31	0.41930	9.61472	36	0.38528	0.03402	5	9.96598	28	37
24	36	9.58101	30	0.41899	9.61508	36	0.38492	0.03407	5	9.96593	24	36
25	40	9.58131	31	0.41869	9.61544	35	0.38456	0.03412	6	9.96588	20	35
26	44	9.58162	30	0.41838	9.61579	36	0.38421	0.03418	5	9.96582	16	34
27	48	9.58192	31	0.41808	9.61615	36	0.38385	0.03423	5	9.96577	12	33
28	52	9.58223	30	0.41777	9.61651	36	0.38349	0.03428	5	9.96572	8	32
29	56	9.58253	31	0.41747	9.61687	35	0.38313	0.03433	5	9.96567	4	31
30	30	9.58284	30	0.41716	9.61722	36	0.38278	0.03438	6	9.96562	30	30
31	4	9.58314	31	0.41686	9.61758	36	0.38242	0.03444	5	9.96556	56	29
32	8	9.58345	30	0.41655	9.61794	36	0.38206	0.03449	5	9.96551	52	28
33	12	9.58375	31	0.41625	9.61830	35	0.38170	0.03454	5	9.96546	48	27
34	16	9.58406	30	0.41594	9.61865	36	0.38135	0.03459	6	9.96541	44	26
35	20	9.58436	31	0.41564	9.61901	35	0.38099	0.03465	5	9.96535	40	25
36	24	9.58467	30	0.41533	9.61936	36	0.38064	0.03470	5	9.96530	36	24
37	28	9.58497	30	0.41503	9.61972	36	0.38028	0.03475	5	9.96525	32	23
38	32	9.58527	30	0.41473	9.62008	35	0.37992	0.03480	6	9.96520	28	22
39	36	9.58557	31	0.41443	9.62043	36	0.37957	0.03486	5	9.96514	24	21
40	40	9.58588	30	0.41412	9.62079	35	0.37921	0.03491	5	9.96509	20	20
41	44	9.58618	30	0.41382	9.62114	36	0.37886	0.03496	6	9.96504	16	19
42	48	9.58648	30	0.41352	9.62150	35	0.37850	0.03502	5	9.96498	12	18
43	52	9.58678	31	0.41322	9.62185	36	0.37815	0.03507	5	9.96493	8	17
44	56	9.58709	30	0.41291	9.62221	35	0.37779	0.03512	5	9.90488	4	16
45	31	9.58739	30	0.41261	9.62256	36	0.37744	0.03517	6	9.96483	29	15
46	4	9.58769	30	0.41231	9.62292	35	0.37708	0.03523	5	9.96477	56	14
47	8	9.58799	30	0.41201	9.62327	35	0.37673	0.03528	5	9.96472	52	13
48	12	9.58829	30	0.41171	9.62362	36	0.37638	0.03533	6	9.96467	48	12
49	16	9.58859	30	0.41141	9.62398	35	0.37602	0.03539	5	9.96461	44	11
50	20	9.58889	30	0.41111	9.62433	35	0.37567	0.03544	5	9.96456	40	10
51	24	9.58919	30	0.41081	9.62468	36	0.37532	0.03549	6	9.96451	36	9
52	28	9.58949	30	0.41051	9.62504	35	0.37496	0.03555	5	9.96445	32	8
53	32	9.58979	30	0.41021	9.62539	35	0.37461	0.03560	5	9.96440	28	7
54	36	9.59009	30	0.40991	9.62574	35	0.37426	0.03565	6	9.96435	24	6
55	40	9.59039	30	0.40961	9.62609	36	0.37391	0.03571	5	9.96429	20	5
56	44	9.59069	29	0.40931	9.62645	35	0.37355	0.03576	5	9.96424	16	4
57	48	9.59098	30	0.40902	9.62680	35	0.37320	0.03581	6	9.96419	12	3
58	52	9.59128	30	0.40872	9.62715	35	0.37285	0.03587	5	9.96413	8	2
59	56	9.59158	30	0.40842	9.62750	35	0.37250	0.03592	5	9.96408	4	1
60	32	9.59188		0.40812	9.62785		0.37215	0.03597		9.96403	28	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 67°

P. p.

″	31	36
10	5	6
20	10	12
30	16	18
40	21	24
50	26	30
6	3	4
7	4	4
8	4	5
9	5	5

″	5	6
10	1	1
20	2	2
30	5	2
40	3	4
50	4	5
6	1	1
7	1	1
8	1	1
9	1	1

″	30	35
10	5	6
20	10	12
30	15	18
40	20	23
50	25	29
6	3	4
7	4	4
8	4	5
9	5	5

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T. 26)

23° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	22	9.59188	30	0.40812	9.62785	35	0.37215	0.03597	6	9.96403	28	60
1	4	9.59218	29	0.40782	9.62820	35	0.37180	0.03603	5	9.96397	56	59
2	8	9.59247	30	0.40753	9.62855	35	0.37145	0.03608	5	9.96392	52	58
3	12	9.59277	30	0.40723	9.62890	36	0.37110	0.03613	6	9.96387	48	57
4	16	9.59307	29	0.40693	9.62926	35	0.37074	0.03619	5	9.96381	44	56
5	20	9.59336	30	0.40664	9.62961	35	0.37039	0.03624	6	9.96376	40	55
6	24	9.59366	30	0.40634	9.62996	35	0.37004	0.03630	5	9.96370	36	54
7	28	9.59396	29	0.40604	9.63031	35	0.36969	0.03635	5	9.96365	32	53
8	32	9.59425	30	0.40575	9.63066	35	0.36934	0.03640	6	9.96360	28	52
9	36	9.59455	29	0.40545	9.63101	34	0.36899	0.03646	5	9.96354	24	51
10	40	9.59484	30	0.40516	9.63135	35	0.36865	0.03651	6	9.96349	20	50
11	44	9.59514	29	0.40486	9.63170	35	0.36830	0.03657	5	9.96343	16	49
12	48	9.59543	30	0.40457	9.63205	35	0.36795	0.03662	5	9.96338	12	48
13	52	9.59573	29	0.40427	9.63240	35	0.36760	0.03667	6	9.96333	8	47
14	56	9.59602	30	0.40398	9.63275	35	0.36725	0.03673	5	9.96327	4	46
15	23	9.59632	29	0.40368	9.63310	35	0.36690	0.03678	6	9.96322	27	45
16	4	9.59661	29	0.40339	9.63345	34	0.36655	0.03684	5	9.96316	56	44
17	8	9.59690	30	0.40310	9.63379	35	0.36621	0.03689	6	9.96311	52	43
18	12	9.59720	29	0.40280	9.63414	35	0.36586	0.03695	5	9.96305	48	42
19	16	9.59749	29	0.40251	9.63449	35	0.36551	0.03700	6	9.96300	44	41
20	20	9.59778	30	0.40222	9.63484	35	0.36516	0.03706	5	9.96294	40	40
21	24	9.59808	29	0.40192	9.63519	34	0.36481	0.03711	5	9.96289	36	39
22	28	9.59837	29	0.40163	9.63553	35	0.36447	0.03716	6	9.96284	32	38
23	32	9.59866	29	0.40134	9.63588	35	0.36412	0.03722	5	9.96278	28	37
24	36	9.59895	29	0.40105	9.63623	34	0.36377	0.03727	6	9.96273	24	36
25	40	9.59924	30	0.40076	9.63657	35	0.36343	0.03733	5	9.96267	20	35
26	44	9.59954	29	0.40046	9.63692	34	0.36308	0.03738	6	9.96262	16	34
27	48	9.59983	29	0.40017	9.63726	35	0.26274	0.03744	5	9.96256	12	33
28	52	9.60012	29	0.39988	9.63761	35	0.36239	0.03749	6	9.96251	8	32
29	56	9.60041	29	0.39959	9.63796	34	0.36204	0.03755	5	9.96245	4	31
30	24	9.60070	29	0.39930	9.63830	35	0.36170	0.03760	6	9.96240	26	30
31	4	9.60099	29	0.39901	9.63865	34	0.36135	0.03766	5	9.96234	56	29
32	8	9.60128	29	0.39872	9.63899	35	0.36101	0.03771	6	9.96229	52	28
33	12	9.60157	29	0.39843	9.63934	34	0.36066	0.03777	5	9.96223	48	27
34	16	9.60186	29	0.39814	9.63968	35	0.36032	0.03782	6	9.96218	44	26
35	20	9.60215	29	0.39785	9.64003	34	0.35997	0.03788	5	9.96212	40	25
36	24	9.60244	29	0.39756	9.64037	35	0.35963	0.03793	6	9.96207	36	24
37	28	9.60273	29	0.39727	9.64072	34	0.35928	0.03799	5	9.96201	32	23
38	32	9.60302	29	0.39698	9.64106	34	0.35894	0.03804	6	9.96196	28	22
39	36	9.60331	28	0.39699	9.64140	35	0.35860	0.03810	5	9.96190	24	21
40	40	9.60359	29	0.39641	9.64175	34	0.35825	0.03815	6	9.96185	20	20
41	44	9.60388	29	0.39612	9.64209	34	0.35791	0.03821	5	9.96179	16	19
42	48	9.60417	29	0.39583	9.64243	35	0.35757	0.03826	6	9.96174	12	18
43	52	9.60446	28	0.39554	9.64278	34	0.35722	0.03832	6	9.96168	8	17
44	56	9.60474	29	0.39526	9.64312	34	0.35688	0.03838	5	9.96162	4	16
45	25	9.60503	29	0.39497	9.64346	35	0.35654	0.03843	6	9.96157	25	15
46	4	9.60532	29	0.39468	9.64381	34	0.35619	0.03849	5	9.96151	56	14
47	8	9.60561	28	0.39439	9.64415	34	0.35585	0.03854	6	9.96146	52	13
48	12	9.60589	29	0.39411	9.64449	34	0.35551	0.03860	5	9.96140	48	12
49	16	9.60618	28	0.39382	9.64483	34	0.35517	0.03865	6	9.96135	44	11
50	20	9.60646	29	0.39354	9.64517	35	0.35483	0.03871	6	9.96129	40	10
51	24	9.60675	29	0.39325	9.64552	34	0.35448	0.03877	5	9.96123	36	9
52	28	9.60704	28	0.39296	9.64586	34	0.35414	0.03882	6	9.96118	32	8
53	32	9.60732	29	0.39268	9.64620	34	0.35380	0.03888	5	9.96112	28	7
54	36	9.60761	28	0.39239	9.64654	34	0.35346	0.03893	6	9.96107	24	6
55	40	9.60789	29	0.39211	9.64688	34	0.35312	0.03899	6	9.96101	20	5
56	44	9.60818	28	0.39182	9.64722	34	0.35278	0.03905	5	9.96095	16	4
57	48	9.60846	29	0.39154	9.64756	34	0.35244	0.03910	6	9.96090	12	3
58	52	9.60875	28	0.39125	9.64790	34	0.35210	0.03916	5	9.96084	8	2
59	56	9.60903	28	0.39097	9.64824	34	0.35176	0.03921	6	9.96079	4	1
60	30	9.60931		0.39069	9.64858		0.35142	0.03927		9.96073	24	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 66°

P. p.

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″	29	34
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Logarithmos das linhas trigonometricas

T. 26)

24° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	**36**	9.60931	29	0.39069	9.64858	34	0.35142	0.03927	6	9.96073	**24**	60
1	4	9.60960	28	0.39040	9.64892	34	0.35108	0.03933	5	9.96067	56	59
2	8	9.60988	28	0.39012	9.64926	34	0.35074	0.03938	6	9.96062	52	58
3	12	9.61016	29	0.38984	9.64960	34	0.35040	0.03944	6	9.96056	48	57
4	16	9.61045	28	0.38955	9.64994	34	0.35006	0.03950	5	9.96050	44	56
5	20	9.61073	28	0.38927	9.65028	34	0.34972	0.03955	6	9.96045	40	55
6	24	9.61101	28	0.38899	9.65062	34	0.34938	0.03961	5	9.96039	36	54
7	28	9.61129	29	0.38871	9.65096	34	0.34904	0.03966	6	9.96034	32	53
8	32	9.61158	28	0.38842	9.65130	34	0.34870	0.03972	6	9.96028	28	52
9	36	9.61186	28	0.38814	9.65164	33	0.34836	0.03978	5	9.96022	24	51
10	40	9.61214	28	0.38786	9.65197	34	0.34803	0.03983	6	9.96017	20	50
11	44	9.61242	28	0.38758	9.65231	34	0.34769	0.03989	6	9.96011	16	49
12	48	9.61270	28	0.38730	9.65265	34	0.34735	0.03995	5	9.96005	12	48
13	52	9.61298	28	0.38702	9.65299	34	0.34701	0.04000	6	9.96000	8	47
14	56	9.61326	28	0.38674	9.65333	33	0.34667	0.04006	6	9.95994	4	46
15	**37**	9.61354	28	0.38646	9.65366	34	0.34634	0.04012	6	9.95988	**23**	45
16	4	9.61382	29	0.38618	9.65400	34	0.34600	0.04018	5	9.95982	56	44
17	8	9.61411	27	0.38589	9.65434	33	0.34566	0.04023	6	9.95977	52	43
18	12	9.61438	28	0.38562	9.65467	34	0.34533	0.04029	6	9.95971	48	42
19	16	9.61466	28	0.38534	9.65501	34	0.34499	0.04035	5	9.95965	44	41
20	20	9.61494	28	0.38506	9.65535	33	0.34465	0.04040	6	9.95960	40	40
21	24	9.61522	28	0.38478	9.65568	34	0.34432	0.04046	6	9.95954	36	39
22	28	9.61550	28	0.38450	9.65602	34	0.34398	0.04052	6	9.95948	32	38
23	32	9.61578	28	0.38422	9.65636	33	0.34364	0.04058	5	9.95942	28	37
24	36	9.61606	28	0.38394	9.65669	34	0.34331	0.04063	6	9.95937	24	36
25	40	9.61634	28	0.38366	9.65703	33	0.34297	0.04069	6	9.95931	20	35
26	44	9.61662	27	0.38338	9.65736	34	0.34264	0.04075	5	9.95925	16	34
27	48	9.61689	28	0.38311	9.65770	33	0.34230	0.04080	6	9.95920	12	33
28	52	9.61717	28	0.38283	9.65803	34	0.34197	0.04086	6	9.95914	8	32
29	56	9.61745	28	0.38255	9.65837	33	0.34163	0.04092	6	9.95908	4	31
30	**38**	9.61773	27	0.38227	9.65870	34	0.34130	0.04098	5	9.95902	**22**	30
31	4	9.61800	28	0.38200	9.65904	33	0.34096	0.04103	6	9.95897	56	29
32	8	9.61828	28	0.38172	9.65937	34	0.34063	0.04109	6	9.95891	52	28
33	12	9.61856	27	0.38144	9.65971	33	0.34029	0.04115	6	9.95885	48	27
34	16	9.61883	28	0.38117	9.66004	34	0.33996	0.04121	6	9.95879	44	26
35	20	9.61911	28	0.38089	9.66038	33	0.33962	0.04127	5	9.95873	40	25
36	24	9.61939	27	0.38061	9.66071	33	0.33929	0.04132	6	9.95868	36	24
37	28	9.61966	28	0.38034	9.66104	34	0.33896	0.04138	6	9.95862	32	23
38	32	9.61994	27	0.38006	9.66138	33	0.33862	0.04144	6	9.95856	28	22
39	36	9.62021	28	0.37979	9.66171	33	0.33829	0.04150	6	9.95850	24	21
40	40	9.62049	27	0.37951	9.66204	34	0.33796	0.04156	5	9.95844	20	20
41	44	9.62076	28	0.37924	9.66238	33	0.33762	0.04161	6	9.95839	16	19
42	48	9.62104	27	0.37896	9.66271	33	0.33729	0.04167	6	9.95833	12	18
43	52	9.62131	28	0.37869	9.66304	33	0.33696	0.04173	6	9.95827	8	17
44	56	9.62159	27	0.37841	9.66337	34	0.33663	0.04179	6	9.95821	4	16
45	**39**	9.62186	28	0.37814	9.66371	33	0.33629	0.04185	5	9.95815	**21**	15
46	4	9.62214	27	0.37786	9.66404	33	0.33596	0.04190	6	9.95810	56	14
47	8	9.62241	27	0.37759	9.66437	33	0.33563	0.04196	6	9.95804	52	13
48	12	9.62268	28	0.37732	9.66470	33	0.33530	0.04202	6	9.95798	48	12
49	16	9.62296	27	0.37704	9.66503	34	0.33497	0.04208	6	9.95792	44	11
50	20	9.62323	27	0.37677	9.66537	33	0.33463	0.04214	6	9.95786	40	10
51	24	9.62350	27	0.37650	9.66570	33	0.33430	0.04220	5	9.95780	36	9
52	28	9.62377	28	0.37623	9.66603	33	0.33397	0.04225	6	9.95775	32	8
53	32	9.62405	27	0.37595	9.66636	33	0.33364	0.04231	6	9.95769	28	7
54	36	9.62432	27	0.37568	9.66669	33	0.33331	0.04237	6	9.95763	24	6
55	40	9.62459	27	0.37541	9.66702	33	0.33298	0.04243	6	9.95757	20	5
56	44	9.62486	27	0.37514	9.66735	33	0.33265	0.04249	6	9.95751	16	4
57	48	9.62513	28	0.37487	9.66768	33	0.33232	0.04255	6	9.95745	12	3
58	52	9.62541	27	0.37459	9.66801	33	0.33199	0.04261	6	9.95739	8	2
59	56	9.62568	27	0.37432	9.66834	33	0.33166	0.04267	5	9.95733	4	1
60	**40**	9.62595		0.37405	9.66867		0.33133	0.04272		9.95728	**20**	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 65°

P. p.

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″	5	6
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″	27	33
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Logarithmos das linhas trigonometricas

T. 26)

25° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	40	9.62595	27	0.37405	9.66867	33	0.33133	0.04272	6	9.95728	20	60
1	4	9.62622	27	0.37378	9.66900	33	0.33100	0.04278	6	9.95722	56	59
2	8	9.62649	27	0.37351	9.66933	33	0.33067	0.04284	6	9.95716	52	58
3	12	9.62676	27	0.37324	9.66966	33	0.33034	0.04290	6	9.95710	48	57
4	16	9.62703	27	0.37297	9.66999	33	0.33001	0.04296	6	9.95704	44	56
5	20	9.62730	27	0.37270	9.67032	33	0.32968	0.04302	6	9.95698	40	55
6	24	9.62757	27	0.37243	9.67065	33	0.32935	0.04308	6	9.95692	36	54
7	28	9.62784	27	0.37216	9.67098	33	0.32902	0.04314	6	9.95686	32	53
8	32	9.62811	27	0.37189	9.67131	32	0.32869	0.04320	6	9.95680	28	52
9	36	9.62838	27	0.37162	9.67163	33	0.32837	0.04326	6	9.95674	24	51
10	40	9.62865	27	0.37135	9.67196	33	0.32804	0.04332	5	9.95668	20	50
11	44	9.62892	26	0.37108	9.67229	33	0.32771	0.04337	6	9.95663	16	49
12	48	9.62918	27	0.37082	9.67262	33	0.32738	0.04343	6	9.95657	12	48
13	52	9.62945	27	0.37055	9.67295	32	0.32705	0.04349	6	9.95651	8	47
14	56	9.62972	27	0.37028	9.67327	33	0.32673	0.04355	6	9.95645	4	46
15	41	9.62999	27	0.37001	9.67360	33	0.32640	0.04361	6	9.95639	19	45
16	4	9.63026	26	0.36974	9.67393	33	0.32607	0.04367	6	9.95633	56	44
17	8	9.63052	27	0.36948	9.67426	32	0.32574	0.04373	6	9.95627	52	43
18	12	9.63079	27	0.36921	9.67458	33	0.32542	0.04379	6	9.95621	48	42
19	16	9.63106	27	0.36894	9.67491	33	0.32509	0.04385	6	9.95615	44	41
20	20	9.63133	26	0.36867	9.67524	32	0.32476	0.04391	6	9.95609	40	40
21	24	9.63159	27	0.36841	9.67556	33	0.32444	0.04397	6	9.95603	36	39
22	28	9.63186	27	0.36814	9.67589	33	0.32411	0.04403	6	9.95597	32	38
23	32	9.63213	26	0.36787	9.67622	32	0.32378	0.04409	6	9.95591	28	37
24	36	9.63239	27	0.36761	9.67654	33	0.32346	0.04415	6	9.95585	24	36
25	40	9.63266	26	0.36734	9.67687	32	0.32313	0.04421	6	9.95579	20	35
26	44	9.63292	27	0.36708	9.67719	33	0.32381	0.04427	6	9.95573	16	34
27	48	9.63319	26	0.36681	9.67752	33	0.32248	0.04433	6	9.95567	12	33
28	52	9.63345	27	0.36655	9.67785	32	0.32215	0.04439	6	9.95561	8	32
29	56	9.63372	26	0.36628	9.67817	33	0.32183	0.04445	6	9.95555	4	31
30	42	9.63398	27	0.36602	9.67850	32	0.32150	0.04451	6	9.95549	18	30
31	4	9.63425	26	0.36575	9.67882	33	0.32118	0.04457	6	9.95543	56	29
32	8	9.63451	27	0.36549	9.67915	32	0.32085	0.04463	6	9.95537	52	28
33	12	9.63478	26	0.36522	9.67947	33	0.32053	0.04469	6	9.95531	48	27
34	16	9.63504	27	0.36496	9.67980	32	0.32020	0.04475	6	9.95525	44	26
35	20	9.63531	26	0.36469	9.68012	32	0.31988	0.04481	6	9.95519	40	25
36	24	9.63557	26	0.36443	9.68044	33	0.31956	0.04487	6	9.95513	36	24
37	28	9.63583	27	0.36417	9.68077	32	0.31923	0.04493	7	9.95507	32	23
38	32	9.63610	26	0.36390	9.68109	33	0.31891	0.04500	6	9.95500	28	22
39	36	9.63636	26	0.36364	9.68142	32	0.31858	0.04506	6	9.95494	24	21
40	40	9.63662	27	0.36338	9.68174	32	0.31826	0.04512	6	9.95488	20	20
41	44	9.63689	26	0.36311	9.68206	33	0.31794	0.04518	6	9.95482	16	19
42	48	9.63715	26	0.36285	9.68239	32	0.31761	0.04524	6	9.95476	12	18
43	52	9.63741	26	0.36259	9.68271	32	0.31729	0.04530	6	9.95470	8	17
44	56	9.63767	27	0.36233	9.68303	33	0.31697	0.04536	6	9.95464	4	16
45	43	9.63794	26	0.36206	9.68336	32	0.31664	0.04542	6	9.95458	17	15
46	4	9.63820	26	0.36180	9.68368	32	0.31632	0.04548	6	9.95452	56	14
47	8	9.63846	26	0.36154	9.68400	32	0.31600	0.04554	6	9.95446	52	13
48	12	9.63872	26	0.36128	9.68432	33	0.31568	0.04560	6	9.95440	48	12
49	16	9.63898	26	0.36102	9.68465	32	0.31535	0.04566	7	9.95434	44	11
50	20	9.63924	26	0.36076	9.68497	32	0.31503	0.04573	6	9.95427	40	10
51	24	9.63950	26	0.36050	9.68529	32	0.31471	0.04579	6	9.95421	36	9
52	28	9.63976	26	0.36024	9.68561	32	0.31439	0.04585	6	9.95415	32	8
53	32	9.64002	26	0.35998	9.68693	33	0.31407	0.04591	6	9.95409	28	7
54	36	9.64028	26	0.35972	9.68626	32	0.31374	0.04597	6	9.95403	24	6
55	40	9.64054	26	0.35946	9.68658	32	0.31342	0.04603	6	9.95397	20	5
56	44	9.64080	26	0.35920	9.68690	32	0.31310	0.04609	7	9.95391	16	4
57	48	9.64106	26	0.35894	9.68722	32	0.31278	0.04616	6	9.95384	12	3
58	52	9.64132	26	0.35868	9.68754	32	0.31246	0.04622	6	9.95378	8	2
59	56	9.64158	26	0.35842	9.68786	32	0.31214	0.04628	6	9.95372	4	1
60	44	9.64184		0.35816	9.68818		0.31182	0.04634		9.95366	18	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 64°

P. p.

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9	4	5

″	5	6
10	1	1
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30	3	3
40	3	4
50	4	5
6	1	1
7	1	1
8	1	1
9	1	1

″	26	32
10	4	5
20	9	11
30	13	16
40	17	21
50	22	27
6	3	3
7	3	4
8	3	4
9	4	5

P. p.

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Logarithmos das linhas trigonometricas

T. 26)

26° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	44	9.64184	26	0.35816	9.68818	32	0.31182	0.04634	6	9.95366	16	60
1	4	9.64210	26	0.35790	9.68850	32	0.31150	0.04640	6	9.95360	56	59
2	8	9.64236	26	0.35764	9.68882	32	0.31118	0.04646	6	9.95354	52	58
3	12	9.64262	26	0.35738	9.68914	32	0.31086	0.04652	7	9.95348	48	57
4	16	9.64288	25	0.35712	9.68946	32	0.31054	0.04659	6	9.95341	44	56
5	20	9.64313	26	0.35687	9.68978	32	0.31022	0.04665	6	9.95335	40	55
6	24	9.64339	26	0.35661	9.69010	32	0.30990	0.04671	6	9.95329	36	54
7	28	9.64365	26	0.35635	9.69042	32	0.30958	0.04677	6	9.95323	32	53
8	32	9.64391	26	0.35609	9.69074	32	0.30926	0.04683	7	9.95317	28	52
9	36	9.64417	25	0.35583	9.69106	32	0.30894	0.04690	6	9.95310	24	51
10	40	9.64442	26	0.35558	9.69138	32	0.30862	0.04691	6	9.95304	20	50
11	44	9.64468	26	0.35532	9.69170	32	0.30830	0.04702	6	9.95298	16	49
12	48	9.64494	25	0.35506	9.69202	32	0.30798	0.04708	6	9.95292	12	48
13	52	9.64519	26	0.35481	9.69234	32	0.30766	0.04714	7	9.95286	8	47
14	56	9.64545	26	0.35455	9.69266	32	0.30734	0.04721	6	9.95279	4	46
15	45	9.64571	25	0.35429	9.69298	31	0.30702	0.04727	6	9.95273	15	45
16	4	9.64596	26	0.35404	9.69329	32	0.30671	0.04733	6	9.95267	56	44
17	8	9.64622	25	0.35378	9.69361	32	0.30639	0.04739	7	9.95261	52	43
18	12	9.64647	26	0.35353	9.69393	32	0.30607	0.04746	6	9.95254	48	42
19	16	9.64673	25	0.35327	9.69425	32	0.30575	0.04752	6	9.95248	44	41
20	20	9.64698	26	0.35302	9.69457	31	0.30543	0.04758	6	9.95242	40	40
21	24	9.64724	25	0.35276	9.69488	32	0.30512	0.04764	7	9.95236	36	39
22	28	9.64749	26	0.35251	9.69520	32	0.30480	0.04771	6	9.95229	32	38
23	32	9.64775	25	0.35225	9.69552	32	0.30448	0.04777	6	9.95223	28	37
24	36	9.64800	26	0.35200	9.69584	31	0.30416	0.04783	6	9.95217	24	36
25	40	9.64826	25	0.35174	9.69615	32	0.30385	0.04789	7	9.95211	20	35
26	44	9.64851	26	0.35149	9.69647	32	0.30353	0.04796	6	9.95204	16	34
27	48	9.64877	25	0.35123	9.69679	31	0.30321	0.04802	6	9.95198	12	33
28	52	9.64902	25	0.35098	9.69710	32	0.30290	0.04808	7	9.95192	8	32
29	56	9.64927	26	0.35073	9.69742	32	0.30258	0.04815	6	9.95185	4	31
30	46	9.64953	25	0.35047	9.69774	31	0.30226	0.04821	6	9.95179	14	30
31	4	9.64978	25	0.35022	9.69805	32	0.30195	0.04827	6	9.95173	56	29
32	8	9.65003	26	0.34997	9.69837	31	0.30163	0.04833	7	9.95167	52	28
33	12	9.65029	25	0.34971	9.69868	32	0.30132	0.04840	6	9.95160	48	27
34	16	9.65054	25	0.34946	9.69900	32	0.30100	0.04846	6	9.95154	44	26
35	20	9.65079	25	0.34921	9.69932	31	0.30068	0.04852	7	9.95148	40	25
36	24	9.65104	26	0.34896	9.99963	32	0.30037	0.04859	6	9.95141	36	24
37	28	9.65130	25	0.34870	9.69995	31	0.30005	0.04865	6	9.95135	32	23
38	32	9.65155	25	0.34845	9.70026	32	0.29974	0.04871	7	9.95129	28	22
39	36	9.65180	25	0.34820	9.70058	31	0.29942	0.04878	6	9.95122	24	21
40	40	9.65205	25	0.34795	9.70089	32	0.29911	0.04884	6	9.95116	20	20
41	44	9.65230	25	0.34770	9.70121	31	0.29879	0.04890	7	9.95110	16	19
42	48	9.65255	26	0.34745	9.70152	32	0.29848	0.04897	6	9.95103	12	18
43	52	9.65281	25	0.34719	9.70184	31	0.29816	0.04903	7	9.95097	8	17
44	56	9.65306	25	0.34694	9.70215	32	0.29785	0.04910	6	9.95090	4	16
45	47	9.65331	25	0.34669	9.70244	31	0.29753	0.04916	6	9.95084	13	15
46	4	9.65356	25	0.34644	9.70278	31	0.29722	0.04922	7	9.95078	56	14
47	8	9.65381	25	0.34619	9.70309	32	0.29691	0.04929	6	9.95071	52	13
48	12	9.65406	25	0.34594	9.70341	31	0.29659	0.04935	6	9.95065	48	12
49	16	9.65431	25	0.34569	9.70372	32	0.29628	0.04941	7	9.95059	44	11
50	20	9.65456	25	0.34544	9.70404	31	0.29596	0.04948	6	9.95052	40	10
51	24	9.65481	25	0.34519	9.70435	31	0.29565	0.04954	7	9.95046	36	9
52	28	9.65506	25	0.34494	9.70466	32	0.29534	0.04961	6	9.95039	32	8
53	32	9.65531	25	0.34469	9.70498	31	0.29502	0.04967	6	9.95033	28	7
54	36	9.65556	24	0.34444	9.70529	31	0.29471	0.04973	7	9.95027	24	6
55	40	9.65580	25	0.34420	9.70560	32	0.29440	0.04980	6	9.95020	20	5
56	44	9.65605	25	0.34395	9.70592	31	0.29408	0.04986	7	9.95014	16	4
57	48	9.65630	25	0.34370	9.70623	31	0.29377	0.04993	6	9.95007	12	3
58	52	9.65655	25	0.34345	9.70654	31	0.29346	0.04999	6	9.95001	8	2
59	56	9.65680	25	0.34320	9.70685	32	0.29315	0.05005	7	9.94995	4	1
60	48	9.65705		0.34295	9.70717		0.29283	0.05012		9.94988	12	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 63°

P. p.

″	25	32
10	4	5
20	8	11
30	13	16
40	17	21
50	21	27
6	3	3
7	3	4
8	3	4
9	4	5

″	6	7
10	1	1
20	2	2
30	3	4
40	4	5
50	5	6
6	1	1
7	1	1
8	1	1
9	1	1

″	24	31
10	4	5
20	8	10
30	12	16
40	16	21
50	20	26
6	2	3
7	3	4
8	3	4
9	4	5

P. p.

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Logarithmos das linhas trigonometricas

T. 26)

27° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	48	9.65705	24	0.34295	9.70717	31	0.29283	0.05012	6	9.94988	12	60
1	4	9.65729	25	0.34271	9.70748	31	0.29252	0.05018	7	9.94982	56	59
2	8	9.65754	25	0.34246	9.70779	31	0.29221	0.05025	6	9.94975	52	58
3	12	9.65779	25	0.34221	9.70810	31	0.29190	0.05031	7	9.94969	48	57
4	16	9.65804	24	0.34196	9.70841	32	0.29159	0.05038	6	9.94962	44	56
5	20	9.65828	25	0.34172	9.70873	31	0.29127	0.05044	7	9.94956	40	55
6	24	9.65853	25	0.34147	9.70904	31	0.29096	0.05051	6	9.94949	36	54
7	28	9.65878	24	0.34122	9.70935	31	0.29065	0.05057	7	9.94943	32	53
8	32	9.65902	25	0.34098	9.70966	31	0.29034	0.05064	6	9.94936	28	52
9	36	9.65927	25	0.34073	9.70997	31	0.29003	0.05070	7	9.94930	24	51
10	40	9.65952	24	0.34048	9.71028	31	0.28972	0.05077	6	9.94923	20	50
11	44	9.65976	25	0.34024	9.71059	31	0.28941	0.05083	6	9.94917	16	49
12	48	9.66001	24	0.33999	9.71090	31	0.28910	0.05089	7	9.94911	12	48
13	52	9.66025	25	0.33975	9.71121	32	0.28879	0.05096	6	9.94904	8	47
14	56	9.66050	25	0.33950	9.71153	31	0.28847	0.05102	7	9.94898	4	46
15	49	9.66075	24	0.33925	9.71184	31	0.28816	0.05109	6	9.94891	11	45
16	4	9.66099	25	0.33901	9.71215	31	0.28785	0.05115	7	9.94885	56	44
17	8	9.66124	24	0.33876	9.71246	31	0.28754	0.05122	7	9.94878	52	43
18	12	9.66148	25	0.33852	9.71277	31	0.28723	0.05129	6	9.94871	48	42
19	16	9.66173	24	0.33827	9.71308	31	0.28692	0.05135	7	9.94865	44	41
20	20	9.66197	24	0.33803	9.71339	31	0.28661	0.05142	6	9.94858	40	40
21	24	9.66221	25	0.33779	9.71370	31	0.28630	0.05148	7	9.94852	36	39
22	28	9.66246	24	0.33754	9.71401	30	0.28599	0.05155	6	9.94845	32	38
23	32	9.66270	25	0.33730	9.71431	31	0.28569	0.05161	7	9.94839	28	37
24	36	9.66295	24	0.33705	9.71462	31	0.28538	0.05168	6	9.94832	24	36
25	40	9.66319	24	0.33681	9.71493	31	0.28507	0.05174	7	9.94826	20	35
26	44	9.66343	25	0.33657	9.71524	31	0.28476	0.05181	6	9.94819	16	34
27	48	9.66368	24	0.33632	9.71555	31	0.28445	0.05187	7	9.94813	12	33
28	52	9.66392	24	0.33608	9.71586	31	0.28414	0.05194	7	9.94806	8	32
29	56	9.66416	25	0.33584	9.71617	31	0.28383	0.05201	6	9.94799	4	31
30	50	9.66441	24	0.33559	9.71648	31	0.28352	0.05207	7	9.94793	10	30
31	4	9.66465	24	0.33535	9.71679	30	0.28321	0.05214	6	9.94786	56	29
32	8	9.66489	24	0.33511	9.71709	31	0.28291	0.05220	7	9.94780	52	28
33	12	9.66513	24	0.33487	9.71740	31	0.28260	0.05227	6	9.94773	48	27
34	16	9.66537	25	0.33463	9.71771	31	0.28229	0.05233	7	9.94767	44	26
35	20	9.66562	24	0.33438	9.71802	31	0.28198	0.05240	7	9.94760	40	25
36	24	9.66586	24	0.33414	9.71833	30	0.28167	0.05247	6	9.94753	36	24
37	28	9.66610	24	0.33390	9.71863	31	0.28137	0.05253	7	9.94747	32	23
38	32	9.66634	24	0.33366	9.71894	31	0.28106	0.05260	6	9.94740	28	22
39	36	9.66658	24	0.33342	9.71925	30	0.28075	0.05266	7	9.94734	24	21
40	40	9.66682	24	0.33318	9.71955	31	0.28045	0.05273	7	9.94727	20	20
41	44	9.66706	25	0.33294	9.71986	31	0.28014	0.05280	6	9.94720	16	19
42	48	9.66731	24	0.33269	9.72017	31	0.27983	0.05286	7	9.94714	12	18
43	52	9.66755	24	0.33245	9.72048	30	0.27952	0.05293	7	9.94707	8	17
44	56	9.66779	24	0.33221	9.72078	31	0.27922	0.05300	6	9.94700	4	16
45	51	9.66803	24	0.33197	9.72109	31	0.27891	0.05306	7	9.94694	0	15
46	4	9.66827	24	0.33173	9.72140	30	0.27860	0.05313	7	9.94687	56	14
47	8	9.66851	24	0.33149	9.72170	31	0.27830	0.05320	6	9.94680	52	13
48	12	9.66875	24	0.33125	9.72201	30	0.27799	0.05326	7	9.94674	48	12
49	16	9.66899	23	0.33101	9.72231	31	0.27769	0.05333	7	9.94667	44	11
50	20	9.66922	24	0.33078	9.72262	31	0.27738	0.05340	6	9.94660	40	10
51	24	9.66946	24	0.33054	9.72293	30	0.27707	0.05346	7	9.94654	36	9
52	28	9.66970	24	0.33030	9.72323	31	0.27677	0.05353	7	9.94647	32	8
53	32	9.66994	24	0.33006	9.72354	30	0.27646	0.05360	6	9.94640	28	7
54	36	9.67018	24	0.32982	9.72384	31	0.27616	0.05366	7	9.94634	24	6
55	40	9.67042	24	0.32958	9.72415	30	0.27585	0.05373	7	9.94627	20	5
56	44	9.67066	24	0.32934	9.72445	31	0.27555	0.05380	6	9.94620	16	4
57	48	9.67090	23	0.32910	9.72476	30	0.27524	0.05386	7	9.94614	12	3
58	52	9.67113	24	0.32887	9.72506	31	0.27494	0.05393	7	9.94607	8	2
59	56	9.67137	24	0.32863	9.72537	30	0.27463	0.05400	7	9.94600	4	1
60	52	9.67161		0.32839	9.72567		0.27433	0.05407		9.94593	0	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 62°

P. p.

″	25	32
10	4	5
20	8	11
30	13	16
40	17	21
50	21	27
6	3	3
7	3	4
8	3	4
9	4	5

″	6	7
10	1	1
20	2	2
30	3	4
40	4	5
50	5	6
6	1	1
7	1	1
8	1	1
9	1	1

″	24	31
10	4	5
20	8	10
30	12	16
40	16	21
50	20	26
6	2	3
7	3	4
8	3	4
9	4	5

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Logarithmos das linhas trigonometricas

T. 26)

28° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	52	9.67161	24	0.32839	9.72567	31	0.27433	0.05407	6	9.94593	8	60
1	4	9.67185	23	0.32815	9.72598	30	0.27402	0.05413	7	9.94587	56	59
2	8	9.67208	24	0.32792	9.72628	31	0.27372	0.05420	7	9.94580	52	58
3	12	9.67232	24	0.32768	9.72659	30	0.27341	0.05427	6	9.94573	48	57
4	16	9.67256	24	0.32744	9.72689	31	0.27311	0.05433	7	9.94567	44	56
5	20	9.67280	23	0.32720	9.72720	30	0.27280	0.05440	7	9.94560	40	55
6	24	9.67303	24	0.32697	9.72750	30	0.27250	0.05447	7	9.94553	36	54
7	28	9.67327	23	0.32673	9.72780	31	0.27220	0.05454	6	9.94546	32	53
8	32	9.67350	24	0.32650	9.72811	30	0.27189	0.05460	7	9.94540	28	52
9	36	9.67374	24	0.32626	9.72841	31	0.27159	0.05467	7	9.94533	24	51
10	40	9.67398	23	0.32602	9.72872	30	0.27128	0.05474	7	9.94526	20	50
11	44	9.67421	24	0.32579	9.72902	30	0.27098	0.05481	6	9.94519	16	49
12	48	9.67445	23	0.32555	9.72932	31	0.27068	0.05487	7	9.94513	12	48
13	52	9.67468	24	0.32532	9.72963	30	0.27037	0.05494	7	9.94506	8	47
14	56	9.67492	23	0.32508	9.72993	30	0.27007	0.05501	7	9.94499	4	46
15	53	9.67515	24	0.32485	9.73023	31	0.26977	0.05508	7	9.94492	2	45
16	4	9.67539	23	0.32461	9.73054	30	0.26946	0.05515	6	9.94485	56	44
17	8	9.67562	24	0.32438	9.73084	30	0.26916	0.05521	7	9.94479	52	43
18	12	9.67586	23	0.32414	9.73114	30	0.26886	0.05528	7	9.94472	48	42
19	16	9.67609	24	0.32391	9.73144	31	0.26856	0.05535	7	9.94465	44	41
20	20	9.67633	23	0.32367	9.73175	30	0.26825	0.05542	7	9.94458	40	40
21	24	9.67656	24	0.32344	9.73205	30	0.26795	0.05549	6	9.94451	36	39
22	28	9.67680	23	0.32320	9.73235	30	0.26765	0.05555	7	9.94445	32	38
23	32	9.67703	23	0.32297	9.73265	30	0.26735	0.05562	7	9.94438	28	37
24	36	9.67726	24	0.32274	9.73295	31	0.26705	0.05569	7	9.94431	24	36
25	40	9.67750	23	0.32250	9.73326	30	0.26674	0.05576	7	9.94424	20	35
26	44	9.67773	23	0.32227	9.73356	30	0.26644	0.05583	7	9.94417	16	34
27	48	9.67796	24	0.32204	9.73386	30	0.26614	0.05590	6	9.94410	12	33
28	52	9.67820	23	0.32180	9.73416	30	0.26584	0.05596	7	9.94404	8	32
29	56	9.67843	23	0.32157	9.73446	30	0.26554	0.05603	7	9.94397	4	31
30	54	9.67866	24	0.32134	9.73476	31	0.26524	0.05610	7	9.94390	8	30
31	4	9.67890	23	0.32110	9.73507	30	0.26493	0.05617	7	9.94383	56	29
32	8	9.67913	23	0.32087	9.73537	30	0.26463	0.05624	7	9.94376	52	28
33	12	9.67936	23	0.32064	9.73567	30	0.26433	0.05631	7	9.94369	48	27
34	16	9.67959	23	0.32041	9.73597	30	0.26403	0.05638	7	9.94362	44	26
35	20	9.67982	24	0.32018	9.73627	30	0.26373	0.05645	6	9.94355	40	25
36	24	9.68006	23	0.31994	9.73657	30	0.26343	0.05651	7	9.94349	36	24
37	28	9.68029	23	0.31971	9.73687	30	0.26313	0.05658	7	9.94342	32	23
38	32	9.68052	23	0.31948	9.73717	30	0.26283	0.05665	7	9.94335	28	22
39	36	9.68075	23	0.31925	9.73747	30	0.26253	0.05672	7	9.94328	24	21
40	40	9.68098	23	0.31902	9.73777	30	0.26223	0.05679	7	9.94321	20	20
41	44	9.68121	23	0.31879	9.73807	30	0.26193	0.05686	7	9.94314	16	19
42	48	9.68144	23	0.31856	9.73837	30	0.26163	0.05693	7	9.94307	12	18
43	52	9.68167	23	0.31833	9.73867	30	0.26133	0.05700	7	9.94300	8	17
44	56	9.68190	23	0.31810	9.73897	30	0.26103	0.05707	7	9.94293	4	16
45	55	9.68213	24	0.31787	9.73927	30	0.26073	0.05714	7	9.94286	5	15
46	4	9.68237	23	0.31763	9.73957	30	0.26043	0.05721	6	9.94279	56	14
47	8	9.68260	23	0.31740	9.73987	30	0.26013	0.05727	7	9.94273	52	13
48	12	9.68283	22	0.31717	9.74017	30	0.25983	0.05734	7	9.94266	48	12
49	16	9.68305	23	0.31695	9.74047	30	0.25953	0.05741	7	9.94259	44	11
50	20	9.68328	23	0.31672	9.74077	30	0.25923	0.05748	7	9.94252	40	10
51	24	9.68351	23	0.31649	9.74107	30	0.25893	0.05755	7	9.94245	36	9
52	28	9.68374	23	0.31626	9.74137	29	0.25863	0.05762	7	9.94238	32	8
53	32	9.68397	23	0.31603	9.74166	30	0.25834	0.05769	7	9.94231	28	7
54	36	9.68420	23	0.31580	9.74196	30	0.25804	0.05776	7	9.94224	24	6
55	40	9.68443	23	0.31557	9.74226	30	0.25774	0.05783	7	9.94217	20	5
56	44	9.68466	23	0.31534	9.74256	30	0.25744	0.05790	7	9.94210	16	4
57	48	9.68489	23	0.31511	9.74286	30	0.25714	0.05797	7	9.94203	12	3
58	52	9.68512	22	0.31488	9.74316	29	0.25684	0.05804	7	9.94196	8	2
59	56	9.68534	23	0.31466	9.74345	30	0.25655	0.05811	7	9.94189	4	1
60	58	9.68557		0.31443	9.74375		0.25625	0.05818		9.94182	4	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 61°

P. p.

″	23	30
10	4	5
20	8	10
30	12	15
40	15	20
50	19	25
6	2	3
7	3	4
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9	3	5

″	6	7
10	1	1
20	2	2
30	3	4
40	4	5
50	5	6
6	1	1
7	1	1
8	1	1
9	1	1

″	22	29
10	4	5
20	7	10
30	11	15
40	15	19
50	18	24
6	2	3
7	3	3
8	3	4
9	3	4

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Logarithmos das linhas trigonometricas

T. 26)

29° ′	1h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	56	9.68557	23	0.31443	9.74375	30	0.25625	0.05818	7	9.94182	4	60
1	4	9.68580	23	0.31420	9.74405	30	0.25595	0.05825	7	9.94175	56	59
2	8	9.68603	22	0.31397	9.74435	30	0.25565	0.05832	7	9.94168	52	58
3	12	9.68625	23	0.31375	9.74465	29	0.25535	0.05839	7	9.94161	48	57
4	16	9.68648	23	0.31352	9.74494	30	0.25506	0.05846	7	9.94154	44	56
5	20	9.68671	23	0.31329	9.74524	30	0.25476	0.05853	7	9.94147	40	55
6	24	9.68694	22	0.31306	9.74554	29	0.25446	0.05860	7	9.94140	36	54
7	28	9.68716	23	0.31284	9.74583	30	0.25417	0.05867	7	9.94133	32	53
8	32	9.68739	23	0.31261	9.74613	30	0.25387	0.05874	7	9.94126	28	52
9	36	9.68762	22	0.31238	9.74643	30	0.25357	0.05881	7	9.94119	24	51
10	40	9.68784	23	0.31216	9.74673	29	0.25327	0.05888	7	9.94112	20	50
11	44	9.68807	22	0.31193	9.74702	30	0.25298	0.05895	7	9.94105	16	49
12	48	9.68829	23	0.31171	9.74732	30	0.25268	0.05902	8	9.94098	12	48
13	52	9.68852	23	0.31148	9.74762	29	0.25238	0.05910	7	9.94090	8	47
14	56	9.68875	22	0.31125	9.74791	30	0.25209	0.05917	7	9.94083	4	46
15	57	9.68897	23	0.31103	9.74821	30	0.25179	0.05924	7	9.94076	3	45
16	4	9.68920	22	0.31080	9.74851	29	0.25149	0.05931	7	9.94069	56	44
17	8	9.68942	23	0.31058	9.74880	30	0.25120	0.05938	7	9.94062	52	43
18	12	9.68965	22	0.31035	9.74910	29	0.25090	0.05945	7	9.94055	48	42
19	16	9.68987	23	0.31013	9.74939	30	0.25061	0.05952	7	9.94048	44	41
20	20	9.69010	22	0.30990	9.74969	29	0.25031	0.05959	7	9.94041	40	40
21	24	9.69032	23	0.30968	9.74998	30	0.25002	0.05966	7	9.94034	36	39
22	28	9.69055	22	0.30945	9.75028	30	0.24972	0.05973	7	9.94027	32	38
23	32	9.69077	23	0.30923	9.75058	29	0.24942	0.05980	8	9.94020	28	37
24	36	9.69100	22	0.30900	9.75087	30	0.24913	0.05988	7	9.94012	24	36
25	40	9.69122	22	0.30878	9.75117	29	0.24883	0.05995	7	9.94005	20	35
26	44	9.69144	23	0.30856	9.75146	30	0.24854	0.06002	7	9.93998	16	34
27	48	9.69167	22	0.30833	9.75176	29	0.24824	0.06009	7	9.93991	12	33
28	52	9.69189	23	0.30811	9.75205	30	0.24795	0.06016	7	9.93984	8	32
29	56	9.69212	22	0.30788	9.75235	29	0.24765	0.06023	7	9.93977	4	31
30	58	9.69234	22	0.30766	9.75264	30	0.24736	0.06030	7	9.93970	2	30
31	4	9.69256	23	0.30744	9.75294	29	0.24706	0.06037	8	9.93963	56	29
32	8	9.69279	22	0.30721	9.75323	30	0.24677	0.06045	7	9.93955	52	28
33	12	9.69301	22	0.30699	9.75353	29	0.24647	0.06052	7	9.93948	48	27
34	16	9.69323	22	0.30677	9.75382	29	0.24618	0.06059	7	9.93941	44	26
35	20	9.69345	23	0.30655	9.75411	30	0.24589	0.06066	7	9.93934	40	25
36	24	9.69368	22	0.30632	9.75441	29	0.24559	0.06073	7	9.93927	36	24
37	28	9.69390	22	0.30610	9.75470	30	0.24530	0.06080	8	9.93920	32	23
38	32	9.69412	22	0.30588	9.75500	29	0.24500	0.06088	7	9.93912	28	22
39	36	9.69434	22	0.30566	9.75529	29	0.24471	0.06095	7	9.93905	24	21
40	40	9.69456	23	0.30544	9.75558	30	0.24442	0.06102	7	9.93898	20	20
41	44	9.69479	22	0.30521	9.75588	29	0.24412	0.06109	7	9.93891	16	19
42	48	9.69501	22	0.30499	9.75617	30	0.24383	0.06116	8	9.93884	12	18
43	52	9.69523	22	0.30477	9.75647	29	0.24353	0.06124	7	9.93876	8	17
44	56	9.69545	22	0.30455	9.75676	29	0.24324	0.06131	7	9.93869	4	16
45	59	9.69567	22	0.30433	9.75705	30	0.24295	0.06138	7	9.93862	1	15
46	4	9.69589	22	0.30411	9.75735	29	0.24265	0.06145	8	9.93855	56	14
47	8	9.69611	22	0.30389	9.75764	29	0.24236	0.06153	7	9.93847	52	13
48	12	9.69633	22	0.30367	9.75793	29	0.24207	0.06160	7	9.93840	48	12
49	16	9.69655	22	0.30345	9.75822	30	0.24178	0.06167	7	9.93833	44	11
50	20	9.69677	22	0.30323	9.75852	29	0.24148	0.06174	7	9.93826	40	10
51	24	9.69699	22	0.30301	9.75881	29	0.24119	0.06181	8	9.93819	36	9
52	28	9.69721	22	0.30279	9.75910	29	0.24090	0.06189	7	9.93811	32	8
53	32	9.69743	22	0.30257	9.75939	30	0.24061	0.06196	7	9.93804	28	7
54	36	9.69765	22	0.30235	9.75969	29	0.24031	0.06203	8	9.93797	24	6
55	40	9.69787	22	0.30213	9.75998	29	0.24002	0.06211	7	9.93789	20	5
56	44	9.69809	22	0.30191	9.76027	29	0.23973	0.06218	7	9.93782	16	4
57	48	9.69831	22	0.30169	9.76056	30	0.23944	0.06225	7	9.93775	12	3
58	52	9.69853	22	0.30147	9.76086	29	0.23914	0.06232	8	9.93768	8	2
59	56	9.69875	22	0.30125	9.76115	29	0.23885	0.06240	7	9.93760	4	1
60	60	9.69897		0.30103	9.76144		0.23856	0.06247		9.93753	0	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 4h	′ 60°

P. p.

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″	7	8
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20	2	3
30	4	4
40	5	5
50	6	7
6	1	1
7	1	1
8	1	1
9	1	1

″	22	29
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30	11	15
40	15	19
50	18	24
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8	3	4
9	3	4

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Logarithmos das linhas trigonometricas

T. 26)

30° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	●	9.69897	22	0.30103	9.76144	29	0.23856	0.06247	7	9.93753	●●	60
1	4	9.69919	22	0.30081	9.76173	29	0.23827	0.06254	8	9.93746	56	59
2	8	9.69941	22	0.30059	9.76202	29	0.23798	0.06262	7	9.93738	52	58
3	12	9.69963	21	0.30037	9.76231	30	0.23769	0.06269	7	9.93731	48	57
4	16	9.69984	22	0.30016	9.76261	29	0.23739	0.06276	7	9.93724	44	56
5	20	9.70006	22	0.29994	9.76290	29	0.23710	0.06283	8	9.93717	40	55
6	24	9.70028	22	0.29972	9.76319	29	0.23681	0.06291	7	9.93709	36	54
7	28	9.70050	22	0.29950	9.76348	29	0.23652	0.06298	7	9.93702	32	53
8	32	9.70072	21	0.29928	9.76377	29	0.23623	0.06305	8	9.93695	28	52
9	36	9.70093	22	0.29907	9.76406	29	0.23594	0.06313	7	9.93687	24	51
10	40	9.70115	22	0.29885	9.76435	29	0.23565	0.06320	7	9.93680	20	50
11	44	9.70137	22	0.29863	9.76464	29	0.23536	0.06327	8	9.93673	16	49
12	48	9.70159	21	0.29841	9.76493	29	0.23507	0.06335	7	9.93665	12	48
13	52	9.70180	22	0.29820	9.76522	29	0.23478	0.06342	8	9.93658	8	47
14	56	9.70202	22	0.29798	9.76551	29	0.23449	0.06350	7	9.93650	4	46
15	2	9.70224	21	0.29776	9.76580	29	0.23420	0.06357	7	9.93643	5●	45
16	4	9.70245	22	0.29755	9.76609	30	0.23391	0.06364	8	9.93636	56	44
17	8	9.70267	21	0.29733	9.76639	29	0.23361	0.06372	7	9.93628	52	43
18	12	9.70288	22	0.29712	9.76668	29	0.23332	0.06379	7	9.93621	48	42
19	16	9.70310	22	0.29690	9.76697	28	0.23303	0.06386	8	9.93614	44	41
20	20	9.70332	21	0.29668	9.76725	29	0.23275	0.06394	7	9.93606	40	40
21	24	9.70353	22	0.29647	9.76754	29	0.23246	0.06401	8	9.93599	36	39
22	28	9.70375	21	0.29625	9.76783	29	0.23217	0.06404	7	9.93591	32	38
23	32	9.70396	22	0.29604	9.76812	29	0.23188	0.06416	7	9.93584	28	37
24	36	9.70418	21	0.29582	9.76841	29	0.23159	0.06423	8	9.93577	24	36
25	40	9.70439	22	0.29561	9.76870	29	0.23130	0.06431	7	9.93569	20	35
26	44	9.70461	21	0.29539	9.76899	29	0.23101	0.06438	8	9.93562	16	34
27	48	9.70482	22	0.29518	9.76928	29	0.23072	0.06446	7	9.93554	12	33
28	52	9.70504	21	0.29496	9.76957	29	0.23043	0.06453	8	9.93547	8	32
29	56	9.70525	22	0.29475	9.76986	29	0.23014	0.06461	7	9.93539	4	31
30	3	9.70547	21	0.29453	9.77015	29	0.22985	0.06468	7	9.93532	5●	30
31	4	9.70568	22	0.29432	9.77044	29	0.22956	0.06475	8	9.93525	56	29
32	8	9.70590	21	0.29410	9.77073	28	0.22927	0.06483	7	9.93517	52	28
33	12	9.70611	22	0.29389	9.77101	29	0.22899	0.06490	8	9.93510	48	27
34	16	9.70633	21	0.29367	9.77130	29	0.22870	0.06498	7	9.93502	44	26
35	20	9.70654	21	0.29346	9.77159	29	0.22841	0.06505	8	9.93495	40	25
36	24	9.70675	22	0.29325	9.77188	29	0.22812	0.06513	7	9.93487	36	24
37	28	9.70697	21	0.29303	9.77217	29	0.22783	0.06520	8	9.93480	32	23
38	32	9.70718	21	0.29282	9.77246	28	0.22754	0.06528	7	9.93472	28	22
39	36	9.70739	22	0.29261	9.77274	29	0.22726	0.06535	8	9.93465	24	21
40	40	9.70761	21	0.29239	9.77303	29	0.22697	0.06543	7	9.93457	20	20
41	44	9.70782	21	0.29218	9.77332	29	0.22668	0.06550	8	9.93450	16	19
42	48	9.70803	21	0.29197	9.77361	29	0.22639	0.06558	7	9.93442	12	18
43	52	9.70824	22	0.29176	9.77390	28	0.22610	0.06565	8	9.93435	8	17
44	56	9.70846	21	0.29154	9.77418	29	0.22582	0.06573	7	9.93427	2	16
45	3	9.70867	21	0.29133	9.77447	29	0.22553	0.06580	8	9.93420	5●	15
46	4	9.70888	21	0.29112	9.77476	29	0.22524	0.06588	7	9.93412	56	14
47	8	9.70909	22	0.29091	9.77505	28	0.22495	0.06595	8	9.93405	52	13
48	12	9.70931	21	0.29069	9.77533	29	0.22467	0.06603	7	9.93397	48	12
49	16	9.70952	21	0.29048	9.77562	29	0.22438	0.06610	8	9.93390	44	11
50	20	9.70973	21	0.29027	9.77591	28	0.22409	0.06618	7	9.93382	40	10
51	24	9.70994	21	0.29006	9.77619	29	0.22381	0.06625	8	9.93375	36	9
52	28	9.71015	21	0.28985	9.77648	29	0.22352	0.06633	7	9.93367	32	8
53	32	9.71036	22	0.28964	9.77677	29	0.22323	0.06640	8	9.93360	28	7
54	36	9.71058	21	0.28942	9.77706	28	0.22294	0.06648	8	9.93352	24	6
55	40	9.71079	21	0.28921	9.77734	29	0.22266	0.06656	7	9.93344	20	5
56	44	9.71100	21	0.28900	9.77763	28	0.22237	0.06663	8	9.93337	16	4
57	48	9.71121	21	0.28879	9.77791	29	0.22209	0.06671	7	9.93329	12	3
58	52	9.71142	21	0.28858	9.77820	29	0.22180	0.06678	8	9.93322	8	2
59	56	9.71163	21	0.28837	9.77849	28	0.22151	0.06686	7	9.93314	4	1
60	4	9.71184		0.28810	9.77877		0.22123	0.06693		9.93307	5●	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	59°

P. p.

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10	4	5
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40	15	19
50	18	24
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7	3	3
8	3	4
9	3	4

	7	8
10	1	1
20	2	3
30	4	4
40	5	5
50	6	7
6	1	1
7	1	1
8	1	1
9	1	1

	21	28
10	4	5
20	7	9
30	11	14
40	14	19
50	18	23
6	2	3
7	2	3
8	3	4
9	3	4

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Logarithmos das linhas trigonometricas

T. 26)

31° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	0	9.71184	21	0.28816	9.77877	29	0.22123	0.06693	8	9.93307	60	60
1	4	9.71205	21	0.28795	9.77906	29	0.22094	0.06701	8	9.93299	56	59
2	8	9.71226	21	0.28774	9.77935	28	0.22065	0.06709	7	9.93291	52	58
3	12	9.71247	21	0.28753	9.77963	29	0.22037	0.06716	8	9.93284	48	57
4	16	9.71268	21	0.28732	9.77992	28	0.22008	0.06724	7	9.93276	44	56
5	20	9.71289	21	0.28711	9.78020	29	0.21980	0.06731	8	9.93269	40	55
6	24	9.71310	21	0.28690	9.78049	28	0.21951	0.06739	8	9.93261	36	54
7	28	9.71331	21	0.28669	9.78077	29	0.21923	0.06747	7	9.93253	32	53
8	32	9.71352	21	0.28648	9.78106	29	0.21894	0.06754	8	9.93246	28	52
9	36	9.71373	20	0.28627	9.78135	28	0.21865	0.06762	8	9.93238	24	51
10	40	9.71393	21	0.28607	9.78163	29	0.21837	0.06770	7	9.93230	20	50
11	44	9.71414	21	0.28586	9.78192	28	0.21808	0.06777	8	9.93223	16	49
12	48	9.71435	21	0.28565	9.78220	29	0.21780	0.06785	8	9.93215	12	48
13	52	9.71456	21	0.28544	9.78249	28	0.21751	0.06793	7	9.93207	8	47
14	56	9.71477	21	0.28523	9.78277	29	0.21723	0.06800	8	9.93200	4	46
15	0	9.71498	21	0.28502	9.78306	28	0.21694	0.06808	8	9.93192	56	45
16	4	9.71519	20	0.28481	9.78334	29	0.21666	0.06816	7	9.93184	56	44
17	8	9.71539	21	0.28461	9.78363	28	0.21637	0.06823	8	9.93177	52	43
18	12	9.71560	21	0.28440	9.78391	28	0.21609	0.06831	8	9.93169	48	42
19	16	9.71581	21	0.28419	9.78419	29	0.21581	0.06839	7	9.93161	44	41
20	20	9.71602	20	0.28398	9.78448	28	0.21552	0.06846	8	9.93154	40	40
21	24	9.71622	21	0.28378	9.78476	29	0.21524	0.06854	8	9.93146	36	39
22	28	9.71643	21	0.28357	9.78505	28	0.21495	0.06862	7	9.93138	32	38
23	32	9.71664	21	0.28336	9.78533	29	0.21467	0.06869	8	9.93131	28	37
24	36	9.71685	20	0.28315	9.78562	28	0.21438	0.06877	8	9.93123	24	36
25	40	9.71705	21	0.28295	9.78590	28	0.21410	0.06885	7	9.93115	20	35
26	44	9.71726	21	0.28274	9.78618	29	0.21382	0.06892	8	9.93108	16	34
27	48	9.71747	20	0.28253	9.78647	28	0.21353	0.06900	8	9.93100	12	33
28	52	9.71767	21	0.28233	9.78675	29	0.21325	0.06908	8	9.93092	8	32
29	56	9.71788	21	0.28212	9.78704	28	0.21296	0.06916	7	9.93084	4	31
30	0	9.71809	20	0.28191	9.78732	28	0.21268	0.06923	8	9.93077	54	30
31	4	9.71829	21	0.28171	9.78760	29	0.21240	0.06931	8	9.93069	56	29
32	8	9.71850	20	0.28150	9.78789	28	0.21211	0.06939	8	9.93061	52	28
33	12	9.71870	21	0.28130	9.78817	28	0.21183	0.06947	7	9.93053	48	27
34	16	9.71891	20	0.28109	9.78845	29	0.21155	0.06954	8	9.93046	44	26
35	20	9.71911	21	0.28089	9.78874	28	0.21126	0.06962	8	9.93038	40	25
36	24	9.71932	20	0.28068	9.78902	28	0.21098	0.06970	8	9.93030	36	24
37	28	9.71952	21	0.28048	9.78930	29	0.21070	0.06978	8	9.93022	32	23
38	32	9.71973	21	0.28027	9.78959	28	0.21041	0.06986	7	9.93014	28	22
39	36	9.71994	20	0.28006	9.78987	28	0.21013	0.06993	8	9.93007	24	21
40	40	9.72014	20	0.27986	9.79015	28	0.20985	0.07001	8	9.92999	20	20
41	44	9.72034	21	0.27966	9.79043	29	0.20957	0.07009	8	9.92991	16	19
42	48	9.72055	20	0.27945	9.79072	28	0.20928	0.07017	7	9.92983	12	18
43	52	9.72075	21	0.27925	9.79100	28	0.20900	0.07024	8	9.92976	8	17
44	56	9.72096	20	0.27904	9.79128	28	0.20872	0.07032	8	9.92968	4	16
45	0	9.72116	21	0.27884	9.79156	29	0.20844	0.07040	8	9.92960	52	15
46	4	9.72137	20	0.27863	9.79185	28	0.20815	0.07048	8	9.92952	56	14
47	8	9.72157	20	0.27843	9.79213	28	0.20787	0.07056	8	9.92944	52	13
48	12	9.72177	21	0.27823	9.79241	28	0.20759	0.07064	7	9.92936	48	12
49	16	9.72198	20	0.27802	9.79269	28	0.20731	0.07071	8	9.92929	44	11
50	20	9.72218	20	0.27782	9.79297	29	0.20703	0.07079	8	9.92921	40	10
51	24	9.72238	21	0.27762	9.79326	28	0.20674	0.07087	8	9.92913	36	9
52	28	9.72259	20	0.27741	9.79354	28	0.20646	0.07095	8	9.92905	32	8
53	32	9.72279	20	0.27721	9.79382	28	0.20618	0.07103	8	9.92897	28	7
54	36	9.72299	21	0.27701	9.79410	28	0.20590	0.07111	8	9.92889	24	6
55	40	9.72320	20	0.27680	9.79438	28	0.20562	0.07119	7	9.92881	20	5
56	44	9.72340	20	0.27660	9.79466	29	0.20534	0.07126	8	9.92874	16	4
57	48	9.72360	21	0.27640	9.79495	28	0.20505	0.07134	8	9.92866	12	3
58	52	9.72381	20	0.27619	9.79523	28	0.20477	0.07142	8	9.92858	8	2
59	56	9.72401	20	0.27599	9.79551	28	0.20449	0.07150	8	9.92850	4	1
60	0	9.72421		0.27579	9.79579		0.20421	0.07158		9.92842	52	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 58°

P. p.

″	21	29
10′	4	5
20	7	10
30	11	15
40	14	19
50	18	24
6	2	3
7	2	3
8	3	4
9	3	4

″	7	8
10	1	1
20	2	3
30	4	4
40	5	5
50	6	7
6	1	1
7	1	1
8	1	1
9	1	1

″	20	28
10	3	5
20	7	9
30	10	14
40	13	19
50	17	23
6	2	3
7	2	3
8	3	4
9	3	4

P. p.

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Logarithmos das linhas trigonometricas

T. 26)

32° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	0	9.72421	20	0.27579	9.79579	28	0.20421	0.07158	8	9.92842	52	60
1	4	9.72441	20	0.27559	9.79607	28	0.20393	0.07166	8	9.92834	56	59
2	8	9.72461	21	0.27539	9.79635	28	0.20365	0.07174	8	9.92826	52	58
3	12	9.72482	20	0.27518	9.79663	28	0.20337	0.07182	8	9.92818	48	57
4	16	9.72502	20	0.27498	9.79691	28	0.20309	0.07190	7	9.92810	44	56
5	20	9.72522	20	0.27478	9.79719	28	0.20281	0.07197	8	9.92803	40	55
6	24	9.72542	20	0 27458	9.79747	29	0.20253	0.07205	8	9.92795	36	54
7	28	9.72562	20	0.27438	9.79776	28	0 20224	0.07213	8	9.92787	32	53
8	32	9.72582	20	0.27418	9.79804	28	0.20196	0.07221	8	9.92779	28	52
9	36	9.72602	20	0.27398	9.79832	28	0.20168	0.07229	8	9.92771	24	51
10	40	9.72622	21	0.27378	9.79860	28	0.20140	0.07237	8	9.92763	20	50
11	44	9.72643	20	0.27357	9.79888	28	0.20112	0.07245	8	9.92755	16	49
12	48	9.72663	20	0.27337	9.79916	28	0.20084	0.07253	8	9.92747	12	48
13	52	9.72683	20	0.27317	9.79944	28	0.20056	0.07261	8	9.92739	8	47
14	56	9.72703	20	0.27297	9.79972	28	0.20028	0.07269	8	9.92731	4	46
15	0	9.72723	20	0.27277	9.80000	28	0.20000	0.07277	8	9.92723	51	45
16	4	9.72743	20	0.27257	9.80028	28	0.19972	0.07285	8	9.92715	56	44
17	8	9.72763	20	0.27237	9.80056	28	0.19944	0.07293	8	9.92707	52	43
18	12	9.72783	20	0.27217	9.80084	28	0.19916	0.07301	8	9.92699	48	42
19	16	9.72803	20	0.27197	9.80112	28	0.19888	0.07309	8	9.92691	44	41
20	20	9.72823	20	0.27177	9.80140	28	0.19860	0.07317	8	9.92683	40	40
21	24	9.72843	20	0.27157	9.80168	27	0.19832	0.07325	8	9.92675	36	39
22	28	9.72863	20	0.27137	9.80195	28	0.19805	0.07333	8	9.92667	32	38
23	32	9.72883	19	0.27117	9.80223	28	0.19777	0.07341	8	9.92659	28	37
24	36	9.72902	20	0.27098	9.80251	28	0.19749	0.07349	8	9.92651	24	36
25	40	9.72922	20	0.27078	9.80279	28	0.19721	0.07357	8	9.92643	20	35
26	44	9.72942	20	0.27058	9.80307	28	0.19693	0.07365	8	9.92635	16	34
27	48	9.72962	20	0.27038	9.80335	28	0.19665	0.07373	8	9.92627	12	33
28	52	9.72982	20	0.27018	9.80363	28	0.19637	0.07381	8	9.92619	8	32
29	56	9.73002	20	0.26998	9.80391	28	0.19609	0.07389	8	9.92611	4	31
30	10	9.73022	19	0.26978	9.80419	28	0.19581	0.07397	8	9.92603	50	30
31	4	9.73041	20	0.26959	9.80447	27	0.19553	0.07405	8	9.92595	56	29
32	8	9.73061	20	0.26939	9.80474	28	0.19526	0.07413	8	9.92587	52	28
33	12	9.73081	20	0.26919	9.80502	28	0.19498	0.07421	8	9.92579	48	27
34	16	9.73101	20	0.26899	9.80530	28	0.19470	0.07429	8	9.92571	44	26
35	20	9.73121	19	0.26879	9.80558	28	0.19442	0.07437	8	9.92563	40	25
36	24	9.73140	20	0.26860	9.80586	28	0.19414	0.07445	9	9.92555	36	24
37	28	9.73160	20	0.26840	9.80614	28	0.19386	0.07454	8	9.92546	32	23
38	32	9.73180	20	0.26820	9.80642	27	0.19358	0.07462	8	9.92538	28	22
39	36	9.73200	19	0.26800	9.80669	28	0.19331	0.07470	8	9.92530	24	21
40	40	9.73219	20	0.26781	9.80697	28	0.19303	0.07478	8	9.92522	20	20
41	44	9.73239	20	0.26761	9.80725	28	0.19275	0.07486	8	9.92514	16	19
42	48	9.73259	19	0.26741	9.80753	28	0.19247	0.07494	8	9.92506	12	18
43	52	9.73278	20	0.26722	9.80781	27	0.19219	0.07502	8	9.92498	8	17
44	56	9.73298	20	0.26702	9.80808	28	0.19192	0.07510	8	9.92490	4	16
45	12	9.73318	19	0.26682	9.80836	28	0.19164	0.07518	9	9.92482	49	15
46	4	9.73337	20	0.26663	9.80864	28	0.19136	0.07527	8	9.92473	56	14
47	8	9.73357	20	0.26643	9.80892	27	0.19108	0.07535	8	9.92465	52	13
48	12	9.73377	19	0.26623	9.80919	28	0.19081	0.07543	8	9.92457	48	12
49	16	9.73396	20	0.26604	9.80947	28	0.19053	0.07551	8	9.92449	44	11
50	20	9.73416	19	0.26584	9.80975	28	0.19025	0.07559	8	9.92441	40	10
51	24	9.73435	20	0.26565	9.81003	27	0.18997	0 07567	8	9.92433	36	9
52	28	9.73455	19	0.26545	9.81030	28	0.18970	0.07575	9	9.92425	32	8
53	32	9.73474	20	0.26526	9.81058	28	0.18942	0.07584	8	9.92416	28	7
54	36	9.73494	19	0.26506	9.81086	27	0.18914	0.07592	8	9.92408	24	6
55	40	9.73513	20	0.26487	9.81113	28	0.18887	0.07600	8	9.92400	20	5
56	44	9.73533	19	0.26467	9.81141	28	0.18859	0.07608	8	9.92392	16	4
57	48	9.73552	20	0.26448	9.81169	27	0.18831	0.07616	8	9.92384	12	3
58	52	9.73572	19	0.26428	9.81196	28	0.18804	0.07624	9	9.92376	8	2
59	56	9.73591	20	0.26409	9.81224	28	0.18776	0 07633	8	9.92367	4	1
60	12	9.73611		0.26389	9.81252		0.18748	0.07641		9.92359	48	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 8h	′ 57°

P. p.

"	20	28
10	3	5
20	7	9
30	10	14
40	13	19
50	17	23
6	2	3
7	2	3
8	3	4
9	3	4

"	8	9
10	1	2
20	3	3
30	4	5
40	5	6
50	7	8
6	1	1
7	1	1
8	1	1
9	1	1

"	19	27
10	3	5
20	6	9
30	10	14
40	13	18
50	16	23
6	2	3
7	2	3
8	3	4
9	3	4

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Logarithmos das linhas trigonometricas

T. 26)

33° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	12	9.73611	19	0.26389	9.81252	27	0.18748	0.07641	8	9.92359	48	60
1	4	9.73630	20	0.26370	9.81279	28	0.18721	0.07619	8	9.92351	56	59
2	8	9.73650	19	0.26350	9.81307	28	0.18693	0.07657	8	9.92343	52	58
3	12	9.73669	20	0.26331	9.81335	27	0.18665	0.07665	9	9.92335	48	57
4	16	9.73689	19	0.26311	9.81362	28	0.18638	0.07674	8	9.92326	44	56
5	20	9.73708	19	0.26292	9.81390	28	0.18610	0.07682	8	9.92318	40	55
6	24	9.73727	20	0.26273	9.81418	27	0.18582	0.07690	8	9.92310	36	54
7	28	9.73747	19	0.26253	9.81445	28	0.18555	0.07698	9	9.92302	32	53
8	32	9.73766	19	0.26234	9.81473	27	0.18527	0.07707	8	9.92293	28	52
9	36	9.73785	20	0.26215	9.81500	27	0.18500	0.07715	8	9.92285	24	51
10	40	9.73805	19	0.26195	9.81528	28	0.18472	0.07723	8	9.92277	20	50
11	44	9.73824	19	0.26176	9.81556	27	0.18444	0.07731	9	9.92269	16	49
12	48	9.73843	20	0.26157	9.81583	28	0.18417	0.07740	8	9.92260	12	48
13	52	9.73863	19	0.26137	9.81611	27	0.18389	0.07748	8	9.92252	8	47
14	56	9.73882	19	0.26118	9.81638	28	0.18362	0.07756	9	9.92244	4	46
15	12	9.73901	20	0.26099	9.81666	27	0.18334	0.07765	8	9.92235	47	45
16	4	9.73921	19	0.26079	9.81693	28	0.18307	0.07773	8	9.92227	56	44
17	8	9.73940	19	0.26060	9.81721	27	0.18279	0.07781	8	9.92219	52	43
18	12	9.73959	19	0.26041	9.81748	28	0.18252	0.07789	9	9.92211	48	42
19	16	9.73978	19	0.26022	9.81776	27	0.18224	0.07798	8	9.92202	44	41
20	20	9.73997	20	0.26003	9.81803	28	0.18197	0.07806	8	9.92194	40	40
21	24	9.74017	19	0.25983	9.81831	27	0.18169	0.07814	9	9.92186	36	39
22	28	9.74036	19	0.25964	9.81858	28	0.18142	0.07823	8	9.92177	32	38
23	32	9.74055	19	0.25945	9.81886	27	0.18114	0.07831	8	9.92169	28	37
24	36	9.74074	19	0.25926	9.81913	28	0.18087	0.07839	9	9.92161	24	36
25	40	9.74093	20	0.25907	9.81941	27	0.18059	0.07848	8	9.92152	20	35
26	44	9.74113	19	0.25887	9.81968	28	0.18032	0.07856	8	9.92144	16	34
27	48	9.74132	19	0.25868	9.81996	27	0.18004	0.07864	9	9.92136	12	33
28	52	9.74151	19	0.25849	9.82023	28	0.17977	0.07873	8	9.92127	8	32
29	56	9.74170	19	0.25830	9.82051	27	0.17949	0.07881	8	9.92119	4	31
30	14	9.74189	19	0.25811	9.82078	28	0.17922	0.07889	9	9.92111	40	30
31	4	9.74208	19	0.25792	9.82106	27	0.17894	0.07898	8	9.92102	56	29
32	8	9.74227	19	0.25773	9.82133	28	0.17867	0.07906	8	9.92094	52	28
33	12	9.74246	19	0.25754	9.82161	27	0.17839	0.07914	9	9.92086	48	27
34	16	9.74265	19	0.25735	9.82188	27	0.17812	0.07923	8	9.92077	44	26
35	20	9.74284	19	0.25716	9.82215	28	0.17785	0.07931	9	9.92069	40	25
36	24	9.74303	19	0.25697	9.82243	27	0.17757	0.07940	8	9.92060	36	24
37	28	9.74322	19	0.25678	9.82270	28	0.17730	0.07948	8	9.92052	32	23
38	32	9.74341	19	0.25659	9.82298	27	0.17702	0.07956	9	9.92044	28	22
39	36	9.74360	19	0.25640	9.82325	27	0.17675	0.07965	8	9.92035	24	21
40	40	9.74379	19	0.25621	9.82352	28	0.17648	0.07973	9	9.92027	20	20
41	44	9.74398	19	0.25602	9.82380	27	0.17620	0.07982	8	9.92018	16	19
42	48	9.74417	19	0.25583	9.82407	28	0.17593	0.07990	8	9.92010	12	18
43	52	9.74436	19	0.25564	9.82435	27	0.17565	0.07998	9	9.92002	8	17
44	56	9.74455	19	0.25545	9.82462	27	0.17538	0.08007	8	9.91993	4	16
45	15	9.74474	19	0.25526	9.82489	28	0.17511	0.08015	9	9.91985	45	15
46	4	9.74493	19	0.25507	9.82517	27	0.17483	0.08024	8	9.91976	56	14
47	8	9.74512	19	0.25488	9.82544	27	0.17456	0.08032	9	9.91968	52	13
48	12	9.74531	18	0.25469	9.82571	28	0.17429	0.08041	8	9.91959	48	12
49	16	9.74549	19	0.25451	9.82599	27	0.17401	0.08049	9	9.91951	44	11
50	20	9.74568	19	0.25432	9.82626	27	0.17374	0.08058	8	9.91942	40	10
51	24	9.74587	19	0.25413	9.82653	28	0.17347	0.08066	9	9.91934	36	9
52	28	9.74606	19	0.25394	9.82681	27	0.17319	0.08075	8	9.91925	32	8
53	32	9.74625	19	0.25375	9.82708	27	0.17292	0.08083	9	9.91917	28	7
54	36	9.74644	18	0.25356	9.82735	27	0.17265	0.08092	8	9.91908	24	6
55	40	9.74662	19	0.25338	9.82762	28	0.17238	0.08100	9	9.91900	20	5
56	44	9.74681	19	0.25319	9.82790	27	0.17210	0.08109	8	9.91891	16	4
57	48	9.74700	19	0.25300	9.82817	27	0.17183	0.08117	9	9.91883	12	3
58	52	9.74719	18	0.25281	9.82844	27	0.17156	0.08126	8	9.91874	8	2
59	56	9.74737	19	0.25263	9.82871	28	0.17129	0.08134	9	9.91866	4	1
60	16	9.74756		0.25244	9.82899		0.17101	0.08143		9.91857	44	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 56°

P. p.

	20	28
10	3	5
20	7	9
30	10	14
40	13	19
50	17	23
6	2	3
7	2	3
8	3	4
9	3	4

	8	9
10	1	2
20	3	3
30	4	5
40	5	6
50	7	8
6	1	1
7	1	1
8	1	1
9	1	1

	19	27
10	3	5
20	6	9
30	10	14
40	13	18
50	16	23
6	2	3
7	2	3
8	3	4
9	3	4

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Logarithmos das linhas trigonometricas

T. 26)

34° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	16	9.74756	19	0.25244	9.82899	27	0.17101	0.08143	8	9.91857	44	60
1	4	9.74775	19	0.25225	9.82926	27	0.17074	0.08151	9	9.91849	56	59
2	8	9.74794	18	0.25206	9.82953	27	0.17047	0.08160	8	9.91840	52	58
3	12	9.74812	19	0.25188	9.82980	28	0.17020	0.08168	9	9.91832	48	57
4	16	9.74831	19	0.25169	9.83008	27	0.16992	0.08177	8	9.91823	44	56
5	20	9.74850	18	0.25150	9.83035	27	0.16965	0.08185	9	9.91815	40	55
6	24	9.74868	19	0.25132	9.83062	27	0.16938	0.08194	8	9.91806	36	54
7	28	9.74887	19	0.25113	9.83089	28	0.16911	0.08202	9	9.91798	32	53
8	32	9.74906	18	0.25094	9.83117	27	0.16883	0.08211	8	9.91789	28	52
9	36	9.74924	19	0.25076	9.83144	27	0.16856	0.08219	9	9.91781	24	51
10	40	9.74943	18	0.25057	9.83171	27	0.16829	0.08228	9	9.91772	20	50
11	44	9.74961	19	0.25039	9.83198	27	0.16802	0.08237	8	9.91763	16	49
12	48	9.74980	19	0.25020	9.83225	27	0.16775	0.08245	9	9.91755	12	48
13	52	9.74999	18	0.25001	9.83252	28	0.16748	0.08254	8	9.91746	8	47
14	56	9.75017	19	0.24983	9.83280	27	0.16720	0.08262	9	9.91738	4	46
15	17	9.75036	18	0.24964	9.83307	27	0.16693	0.08271	9	9.91729	43	45
16	4	9.75054	19	0.24946	9.83334	27	0.16666	0.08280	8	9.91720	56	44
17	8	9.75073	18	0.24927	9.83361	27	0.16639	0.08288	9	9.91712	52	43
18	12	9.75091	19	0.24909	9.83388	27	0.16612	0.08297	8	9.91703	48	42
19	16	9.75110	18	0.24890	9.83415	27	0.16585	0.08305	9	9.91695	44	41
20	20	9.75128	19	0.24872	9.83442	28	0.16558	0.08314	9	9.91686	40	40
21	24	9.75147	18	0.24853	9.83470	27	0.16530	0.08323	8	9.91677	36	39
22	28	9.75165	19	0.24835	9.83497	27	0.16503	0.08331	9	9.91669	32	38
23	32	9.75184	18	0.24816	9.83524	27	0.16476	0.08340	9	9.91660	28	37
24	36	9.75202	19	0.24798	9.83551	27	0.16449	0.08349	8	9.91651	24	36
25	40	9.75221	18	0.24779	9.83578	27	0.16422	0.08357	9	9.91643	20	35
26	44	9.75239	19	0.24761	9.83605	27	0.16395	0.08366	9	9.91634	16	34
27	48	9.75258	18	0.24742	9.83632	27	0.16368	0.08375	8	9.91625	12	33
28	52	9.75276	18	0.24724	9.83659	27	0.16341	0.08383	9	9.91617	8	32
29	56	9.75294	19	0.24706	9.83686	27	0.16314	0.08392	9	9.91608	4	31
30	18	9.75313	18	0.24687	9.83713	27	0.16287	0.08401	8	9.91599	42	30
31	4	9.75331	19	0.24669	9.83740	28	0.16260	0.08409	9	9.91591	56	29
32	8	9.75350	18	0.24650	9.83768	27	0.16232	0.08418	9	9.91582	52	28
33	12	9.75368	18	0.24632	9.83795	27	0.16205	0.08427	8	9.91573	48	27
34	16	9.75386	19	0.24614	9.83822	27	0.16178	0.08435	9	9.91565	44	26
35	20	9.75405	18	0.24595	9.83849	27	0.16151	0.08444	9	9.91556	40	25
36	24	9.75423	18	0.24577	9.83876	27	0.16124	0.08453	9	9.91547	36	24
37	28	9.75441	18	0.24559	9.83903	27	0.16097	0.08462	8	9.91538	32	23
38	32	9.75459	19	0.24541	9.83930	27	0.16070	0.08470	9	9.91530	28	22
39	36	9.75478	18	0.24522	9.83957	27	0.16043	0.08479	9	9.91521	24	21
40	40	9.75496	18	0.24504	9.83984	27	0.16016	0.08488	8	9.91512	20	20
41	44	9.75514	19	0.24486	9.84011	27	0.15989	0.08496	9	9.91504	16	19
42	48	9.75533	18	0.24467	9.84038	27	0.15962	0.08505	9	9.91495	12	18
43	52	9.75551	18	0.24449	9.84065	27	0.15935	0.08514	9	9.91486	8	17
44	56	9.75569	18	0.24431	9.84092	27	0.15908	0.08523	8	9.91477	4	16
45	19	9.75587	18	0.24413	9.84119	27	0.15881	0.08531	9	9.91469	41	15
46	4	9.75605	19	0.24395	9.84146	27	0.15854	0.08540	9	9.91460	56	14
47	8	9.75624	18	0.24376	9.84173	27	0.15827	0.08549	9	9.91451	52	13
48	12	9.75642	18	0.24358	9.84200	27	0.15800	0.08558	9	9.91442	48	12
49	16	9.75660	18	0.24340	9.84227	27	0.15773	0.08567	8	9.91433	44	11
50	20	9.75678	18	0.24322	9.84254	26	0.15746	0.08575	9	9.91425	40	10
51	24	9.75696	18	0.24304	9.84280	27	0.15720	0.08584	9	9.91416	36	9
52	28	9.75714	19	0.24286	9.84307	27	0.15693	0.08593	9	9.91407	32	8
53	32	9.75733	18	0.24267	9.84334	27	0.15666	0.08602	9	9.91398	28	7
54	36	9.75751	18	0.24249	9.84361	27	0.15639	0.08611	8	9.91389	24	6
55	40	9.75769	18	0.24231	9.84388	27	0.15612	0.08619	9	9.91381	20	5
56	44	9.75787	18	0.24213	9.84415	27	0.15585	0.08628	9	9.91372	16	4
57	48	9.75805	18	0.24195	9.84442	27	0.15558	0.08637	9	9.91363	12	3
58	52	9.75823	18	0.24177	9.84469	27	0.15531	0.08646	9	9.91354	8	2
59	56	9.75841	18	0.24159	9.84496	27	0.15504	0.08655	9	9.91345	4	1
60	20	9.75859		0.24141	9.84523		0.15477	0.08664		9.91336	40	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 55°

P. p.

″	19	27
10	3	5
20	6	9
30	10	14
40	13	18
50	16	23
6	2	3
7	2	3
8	3	4
9	3	4

″	8	9
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20	3	3
30	4	5
40	5	6
50	7	8
6	1	1
7	1	1
8	1	1
9	1	1

″	18	26
10	3	4
20	6	9
30	9	13
40	12	17
50	15	22
6	2	3
7	2	3
8	2	3
9	3	4

P. p.

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Logarithmos das linhas trigonometricas

T. 26)

35° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	20	9.75859	18	0.24141	9.84523	27	0.15477	0.08664	8	9.91336	40	60
1	4	9.75877	18	0.24123	9.84550	26	0.15450	0.08672	9	9.91328	56	59
2	8	9.75895	18	0.24105	9.84576	27	0.15424	0.08681	9	9.91319	52	58
3	12	9.75913	18	0.24087	9.84603	27	0.15397	0.08690	9	9.91310	48	57
4	16	9.75931	18	0.24069	9.84630	27	0.15370	0.08699	9	9.91301	44	56
5	20	9.75949	18	0.24051	9.84657	27	0.15343	0.08708	9	9.91292	40	55
6	24	9.75967	18	0.24033	9.84684	27	0.15316	0.08717	9	9.91283	36	54
7	28	9.75985	18	0.24015	9.84711	27	0.15289	0.08726	8	9.91274	32	53
8	32	9.76003	18	0.23997	9.84738	26	0.15262	0.08734	9	9.91266	28	52
9	36	9.76021	18	0.23979	9.84764	27	0.15236	0.08743	9	9.91257	24	51
10	40	9.76039	18	0.23961	9.84791	27	0.15209	0.08752	9	9.91248	20	50
11	44	9.76057	18	0.23943	9.84818	27	0.15182	0.08761	9	9.91239	16	49
12	48	9.76075	18	0.23925	9.84845	27	0.15155	0.08770	9	9.91230	12	48
13	52	9.76093	18	0.23907	9.84872	27	0.15128	0.08779	9	9.91221	8	47
14	56	9.76111	18	0.23889	9.84899	26	0.15101	0.08788	9	9.91212	4	46
15	21	9.76129	17	0.23871	9.84925	27	0.15075	0.08797	9	9.91203	20	45
16	4	9.76146	18	0.23854	9.84952	27	0.15048	0.08806	9	9.91194	56	44
17	8	9.76164	18	0.23836	9.84979	27	0.15021	0.08815	9	9.91185	52	43
18	12	9.76182	18	0.23818	9.85006	27	0.14994	0.08824	9	9.91176	48	42
19	16	9.76200	18	0.23800	9.85033	26	0.14967	0.08833	9	9.91167	44	41
20	20	9.76218	18	0.23782	9.85059	27	0.14941	0.08842	9	9.91158	40	40
21	24	9.76236	17	0.23764	9.85086	27	0.14914	0.08851	8	9.91149	36	39
22	28	9.76253	18	0.23747	9.85113	27	0.14887	0.08859	9	9.91141	32	38
23	32	9.76271	18	0.23729	9.85140	26	0.14860	0.08868	9	9.91132	28	37
24	36	9.76289	18	0.23711	9.85166	27	0.14834	0.08877	9	9.91123	24	36
25	40	9.76307	17	0.23693	9.85193	27	0.14807	0.08886	9	9.91114	20	35
26	44	9.76324	18	0.23676	9.85220	27	0.14780	0.08895	9	9.91105	16	34
27	48	9.76342	18	0.23658	9.85247	26	0.14753	0.08904	9	9.91096	12	33
28	52	9.76360	18	0.23640	9.85273	27	0.14727	0.08913	9	9.91087	8	32
29	56	9.70378	17	0.23622	9.85300	27	0.14700	0.08922	9	9.91078	4	31
30	22	9.76395	18	0.23605	9.85327	27	0.14673	0.08931	9	9.91069	20	30
31	4	9.76413	18	0.23587	9.85354	26	0.14646	0.08940	9	9.91060	56	29
32	8	9.76431	17	0.23569	9.85380	27	0.14620	0.08949	9	9.91051	52	28
33	12	9.76448	18	0.23552	9.85407	27	0.14593	0.08958	9	9.91042	48	27
34	16	9.76466	18	0.23534	9.85434	26	0.14566	0.08967	10	9.91033	44	26
35	20	9.76484	17	0.23516	9.85460	27	0.14540	0.08977	9	9.91023	40	25
36	24	9.76501	18	0.23499	9.85487	27	0.14513	0.08986	9	9.91014	36	24
37	28	9.76519	18	0.23481	9.85514	26	0.14486	0.08995	9	9.91005	32	23
38	32	9.76537	17	0.23463	9.85540	27	0.14460	0.09004	9	9.90996	28	22
39	36	9.76554	18	0.23446	9.85567	27	0.14433	0.09013	9	9.90987	24	21
40	40	9.76572	18	0.23428	9.85594	26	0.14406	0.09022	9	9.90978	20	20
41	44	9.76590	17	0.23410	9.85620	27	0.14380	0.09031	9	9.90969	16	19
42	48	9.76607	18	0.23393	9.85647	27	0.14353	0.09040	9	9.90960	12	18
43	52	9.76625	17	0.23375	9.85674	26	0.14326	0.09049	9	9.90951	8	17
44	56	9.76642	18	0.23358	9.85700	27	0.14300	0.09058	9	9.90942	4	16
45	23	9.76660	17	0.23240	9.85727	27	0.14273	0.09067	9	9.90933	27	15
46	4	9.76677	18	0.23323	9.85754	26	0.14246	0.09076	9	9.90924	56	14
47	8	9.76695	17	0.23305	9.85780	27	0.14220	0.09085	9	9.90915	52	13
48	12	9.76712	18	0.23288	9.85807	27	0.14193	0.09094	10	9.90906	48	12
49	16	9.76730	17	0.23270	9.85834	26	0.14166	0.09104	9	9.90896	44	11
50	20	9.76747	18	0.23253	9.85860	27	0.14140	0.09113	9	9.90887	40	10
51	24	9.76765	17	0.23235	9.85887	26	0.14113	0.09122	9	9.90878	36	9
52	28	9.76782	18	0.23218	9.85913	27	0.14087	0.09131	9	9.90869	32	8
53	32	9.76800	17	0.23200	9.85940	27	0.14060	0.09140	9	9.90860	28	7
54	36	9.76817	18	0.23183	9.85967	26	0.14033	0.09149	9	9.90851	24	6
55	40	9.76835	17	0.23165	9.85993	27	0.14007	0.09158	10	9.90842	20	5
56	44	9.76852	18	0.23148	9.86020	26	0.13980	0.09168	9	9.90832	16	4
57	48	9.76870	17	0.23130	9.86046	27	0.13954	0.09177	9	9.90823	12	3
58	52	9.76887	17	0.23113	9.86073	27	0.13927	0.09186	9	9.90814	8	2
59	56	9.76904	18	0.23096	9.86100	26	0.13900	0.09195	9	9.90805	4	1
60	24	9.76922		0.23078	9.86126		0.13874	0.09204		9.90796	20	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 54°

P. p.

″	18	27
10	3	5
20	6	9
30	9	14
40	12	18
50	15	23
6	2	3
7	2	3
8	2	4
9	3	4

″	8	9
10	1	2
20	3	3
30	4	5
40	5	6
50	7	8
6	1	1
7	1	1
8	1	1
9	1	1

″	17	26
10	3	4
20	6	9
30	9	13
40	11	17
50	14	22
6	2	3
7	2	3
8	2	3
9	3	4

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Logarithmos das linhas trigonometricas

T. 26)

36° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	24	9.76922	17	0.23078	9.86126	27	0.13874	0.09204	9	9.90796	36	60
1	4	9.76939	18	0.23061	9.86153	26	0.13847	0.09213	10	9.90787	56	59
2	8	9.76957	17	0.23043	9.86179	27	0.13821	0.09223	9	9.90777	52	58
3	12	9.76974	17	0.23026	9.86206	26	0.13794	0.09232	9	9.90768	48	57
4	16	9.76991	18	0.23009	9.86232	27	0.13768	0.09241	9	9.90759	44	56
5	20	9.77009	17	0.22991	9.86259	26	0.13741	0.09250	9	9.90750	40	55
6	24	9.77026	17	0.22974	9.86285	27	0.13715	0.09259	10	9.90741	36	54
7	28	9.77043	18	0.22957	9.86312	26	0.13688	0.09269	9	9.90731	32	53
8	32	9.77061	17	0.22939	9.86338	27	0.13662	0.09278	9	9.90722	28	52
9	36	9.77078	17	0.22922	9.86365	27	0.13635	0.09287	9	9.90713	24	51
10	40	9.77095	17	0.22905	9.86392	26	0.13608	0.09296	10	9.90704	20	50
11	44	9.77112	18	0.22888	9.86418	27	0.13582	0.09306	9	9.90694	16	49
12	48	9.77130	17	0.22870	9.86445	26	0.13555	0.09315	9	9.90685	12	48
13	52	9.77147	17	0.22853	9.86471	27	0.13529	0.09324	9	9.90676	8	47
14	56	9.77164	17	0.22836	9.86498	26	0.13502	0.09333	10	9.90667	4	46
15	25	9.77181	18	0.22819	9.86524	27	0.13476	0.09343	9	9.90657	25	45
16	4	9.77199	17	0.22801	9.86551	26	0.13449	0.09352	9	9.90648	56	44
17	8	9.77216	17	0.22784	9.86577	26	0.13423	0.09361	9	9.90639	52	43
18	12	9.77233	17	0.22767	9.86603	27	0.13397	0.09370	10	9.90630	48	42
19	16	9.77250	18	0.22750	9.86630	26	0.13370	0.09380	9	9.90620	44	41
20	20	9.77268	17	0.22732	9.86656	27	0.13344	0.09389	9	9.90611	40	40
21	24	9.77285	17	0.22715	9.86683	26	0.13317	0.09398	10	9.90602	36	39
22	28	9.77302	17	0.22698	9.86709	27	0.13291	0.09408	9	9.90592	32	38
23	32	9.77319	17	0.22681	9.86736	26	0.13264	0.09417	9	9.90583	28	37
24	36	9.77336	17	0.22664	9.86762	27	0.13238	0.09426	9	9.90574	24	36
25	40	9.77353	17	0.22647	9.86789	26	0.13211	0.09435	10	9.90565	20	35
26	44	9.77370	17	0.22630	9.86815	27	0.13185	0.09445	9	9.90555	16	34
27	48	9.77387	18	0.22613	9.86842	26	0.13158	0.09454	9	9.90546	12	33
28	52	9.77405	17	0.22595	9.86868	26	0.13132	0.09463	10	9.90537	8	32
29	56	9.77422	17	0.22578	9.86894	27	0.13106	0.09473	9	9.90527	4	31
30	26	9.77439	17	0.22561	9.86921	26	0.13079	0.09482	9	9.90518	24	30
31	4	9.77456	17	0.22544	9.86947	27	0.13053	0.09491	10	9.90509	56	29
32	8	9.77473	17	0.22527	9.86974	26	0.13026	0.09501	9	9.90499	52	28
33	12	9.77490	17	0.22510	9.87000	27	0.13000	0.09510	10	9.90490	48	27
34	16	9.77507	17	0.22493	9.87027	26	0.12973	0.09520	9	9.90480	44	26
35	20	9.77524	17	0.22476	9.87053	26	0.12947	0.09529	9	9.90471	40	25
36	24	9.77541	17	0.22459	9.87079	27	0.12921	0.09538	10	9.90462	36	24
37	28	9.77558	17	0.22422	9.87106	26	0.12894	0.09548	9	9.90452	32	23
38	32	9.77575	17	0.22425	9.87132	26	0.12868	0.09557	9	9.90443	28	22
39	36	9.77592	17	0.22408	9.87158	27	0.12842	0.09566	10	9.90434	24	21
40	40	9.77609	17	0.22391	9.87185	26	0.12815	0.09576	9	9.90424	20	20
41	44	9.77626	17	0.22374	9.87211	27	0.12789	0.09585	10	9.90415	16	19
42	48	9.77643	17	0.22357	9.87238	26	0.12762	0.09595	9	9.90405	12	18
43	52	9.77660	17	0.22340	9.87264	26	0.12736	0.09604	10	9.90396	8	17
44	56	9.77677	17	0.22323	9.87290	27	0.12710	0.09614	9	9.90386	4	16
45	27	9.77694	17	0.22306	9.87317	26	0.12683	0.09623	9	9.90377	22	15
46	4	9.77711	17	0.22289	9.87343	26	0.12657	0.09632	10	9.90368	56	14
47	8	9.77728	16	0.22272	9.87369	27	0.12631	0.09642	9	9.90358	52	13
48	12	9.77744	17	0.22256	9.87396	26	0.12604	0.09651	10	9.90349	48	12
49	16	9.77761	17	0.22239	9.87422	26	0.12578	0.09661	9	9.90339	44	11
50	20	9.77778	17	0.22222	9.87448	27	0.12552	0.09670	10	9.90330	40	10
51	24	9.77795	17	0.22205	9.87475	26	0.12525	0.09680	9	9.90320	36	9
52	28	9.77812	17	0.22188	9.87501	26	0.12499	0.09689	10	9.90311	32	8
53	32	9.77829	17	0.22171	9.87527	27	0.12473	0.09699	9	9.90301	28	7
54	36	9.77846	16	0.22154	9.87554	26	0.12446	0.09708	10	9.90292	24	6
55	40	9.77862	17	0.22138	9.87580	26	0.12420	0.09718	9	9.90282	20	5
56	44	9.77879	17	0.22121	9.87606	27	0.12394	0.09727	10	9.90273	16	4
57	48	9.77896	17	0.22104	9.87633	26	0.12367	0.09737	9	9.90263	12	3
58	52	9.77913	17	0.22087	9.87659	26	0.12341	0.09746	10	9.90254	8	2
59	56	9.77930	16	0.22070	9.87685	26	0.12315	0.09756	9	9.90244	4	1
60	28	9.77946		0.22054	9.87711		0.12289	0.09765		9.90235	28	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 53°

P. p.

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9	1	2

″	16	26
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8	2	3
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Logarithmos das linhas trigonometricas

T. 26)

37° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	00	9.77946	17	0.22054	9.87711	27	0.12289	0.09765	10	9.90235	00	60
1	4	9.77963	17	0.22037	9.87738	26	0.12262	0.09775	9	9.90225	56	59
2	8	9.77980	17	0.22020	9.87764	26	0.12230	0.09784	10	9.90216	52	58
3	12	9.77997	16	0.22003	9.87790	27	0.12210	0.09794	9	9.90206	48	57
4	16	9.78013	17	0.21987	9.87817	26	0.12183	0.09803	10	9.90197	44	56
5	20	9.78030	17	0.21970	9.87843	26	0.12157	0.09813	9	9.90187	40	55
6	24	9.78047	16	0.21953	9.87869	26	0.12131	0.09822	10	9.90178	36	54
7	28	9.78063	17	0.21937	9.87895	27	0.12105	0.09832	9	9.90168	32	53
8	32	9.78080	17	0.21920	9.87922	26	0.12078	0.09841	10	9.90159	28	52
9	36	9.78097	16	0.21903	9.87948	26	0.12052	0.09851	10	9.90149	24	51
10	40	9.78113	17	0.21887	9.87974	26	0.12026	0.09861	9	9.90139	20	50
11	44	9.78130	17	0.21870	9.88000	27	0.12000	0.09870	10	9.90130	16	49
12	48	9.78147	16	0.21853	9.88027	26	0.11973	0.09880	9	9.90120	12	48
13	52	9.78163	17	0.21837	9.88053	26	0.11947	0.09889	10	9.90111	8	47
14	56	9.78180	17	0.21820	9.88079	26	0.11921	0.09899	10	9.90101	4	46
15	00	9.78197	16	0.21803	9.88105	26	0.11895	0.09909	9	9.90091	01	45
16	4	9.78213	17	0.21787	9.88131	27	0.11869	0.09918	10	9.90082	56	44
17	8	9.78230	16	0.21770	9.88158	26	0.11842	0.09928	9	9.90072	52	43
18	12	9.78246	17	0.21754	9.88184	26	0.11816	0.09937	10	9.90063	48	42
19	16	9.78263	17	0.21737	9.88210	26	0.11790	0.09947	10	9.90053	44	41
20	20	9.78280	16	0.21720	9.88236	26	0.11764	0.09957	9	9.90043	40	40
21	24	9.78296	17	0.21704	9.88262	27	0.11738	0.09966	10	9.90034	36	39
22	28	9.78313	16	0.21687	9.88289	26	0.11711	0.09976	10	9.90024	32	38
23	32	9.78329	17	0.21671	9.88315	26	0.11685	0.09986	9	9.90014	28	37
24	36	9.78346	16	0.21654	9.88341	26	0.11659	0.09995	10	9.90005	24	36
25	40	9.78362	17	0.21638	9.88367	26	0.11633	0.10005	10	9.89995	20	35
26	44	9.78379	16	0.21621	9.88393	27	0.11607	0.10015	9	9.89985	16	34
27	48	9.78395	17	0.21605	9.88420	26	0.11580	0.10024	10	9.89976	12	33
28	52	9.78412	16	0.21588	9.88446	26	0.11554	0.10034	10	9.89966	8	32
29	56	9.78428	17	0.21572	9.88472	26	0.11528	0.10044	9	9.89956	4	31
30	00	9.78445	16	0.21555	9.88498	26	0.11502	0.10053	10	9.89947	00	30
31	4	9.78461	17	0.21539	9.88524	26	0.11476	0.10063	10	9.89937	56	29
32	8	9.78478	16	0.21522	9.88550	27	0.11450	0.10073	9	9.89927	52	28
33	12	9.78494	16	0.21506	9.88577	26	0.11423	0.10082	10	9.89918	48	27
34	16	9.78510	17	0.21490	9.88603	26	0.11397	0.10092	10	9.89908	44	26
35	20	9.78527	16	0.21473	9.88629	26	0.11371	0.10102	10	9.89898	40	25
36	24	9.78543	17	0.21457	9.88655	26	0.11345	0.10112	9	9.89888	36	24
37	28	9.78560	16	0.21440	9.88681	26	0.11319	0.10121	10	9.89879	32	23
38	32	9.78576	16	0.21424	9.88707	26	0.11293	0.10131	10	9.89869	28	22
39	36	9.78592	17	0.21408	9.88733	26	0.11267	0.10141	10	9.89859	24	21
40	40	9.78609	16	0.21391	9.88759	27	0.11241	0.10151	9	9.89849	20	20
41	44	9.78625	17	0.21375	9.88786	26	0.11214	0.10160	10	9.89840	16	19
42	48	9.78642	16	0.21358	9.88812	26	0.11188	0.10170	10	9.89830	12	18
43	52	9.78658	16	0.21342	9.88838	26	0.11162	0.10180	10	9.89820	8	17
44	56	9.78674	17	0.21326	9.88864	26	0.11136	0.10190	9	9.89810	4	16
45	01	9.78691	16	0.21309	9.88890	26	0.11110	0.10199	10	9.89801	00	15
46	4	9.78707	16	0.21293	9.88916	26	0.11084	0.10209	10	9.89791	56	14
47	8	9.78723	16	0.21277	9.88942	26	0.11058	0.10219	10	9.89781	52	13
48	12	9.78739	17	0.21261	9.88968	26	0.11032	0.10229	10	9.89771	48	12
49	16	9.78756	16	0.21244	9.88994	26	0.11006	0.10239	9	9.89761	44	11
50	20	9.78772	16	0.21228	9.89020	26	0.10980	0.10248	10	9.89752	40	10
51	24	9.78788	17	0.21212	9.89046	27	0.10954	0.10258	10	9.89742	36	9
52	28	9.78805	16	0.21195	9.89073	26	0.10927	0.10268	10	9.89732	32	8
53	32	9.78821	16	0.21179	9.89099	26	0.10901	0.10278	10	9.89722	28	7
54	36	9.78837	16	0.21163	9.89125	26	0.10875	0.10288	10	9.89712	24	6
55	40	9.78853	16	0.21147	9.89151	26	0.10849	0.10298	9	9.89702	20	5
56	44	9.78869	17	0.21131	9.89177	26	0.10823	0.10307	10	9.89693	16	4
57	48	9.78886	16	0.21114	9.89203	26	0.10797	0.10317	10	9.89683	12	3
58	52	9.78902	16	0.21098	9.89229	26	0.10771	0.10327	10	9.89673	8	2
59	56	9.78918	16	0.21082	9.89255	26	0.10745	0.10337	10	9.89663	4	1
60	00	9.78934		0.21066	9.89281		0.10719	0.10347		9.89653	00	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 52°

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50	8	8
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9	1	2

″	16	26
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20	5	9
30	8	13
40	11	17
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Logarithmos das linhas trigonometricas

T. 26)

38° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	32	9.78934	16	0.21066	9.89281	26	0.10719	0.10347	10	9.89653	28	60
1	4	9.78950	17	0.21050	9.89307	26	0.10693	0.10357	10	9.89643	56	59
2	8	9.78967	16	0.21033	9.89333	26	0.10667	0.10367	9	9.89633	52	58
3	12	9.78983	16	0.21017	9.89359	26	0.10641	0.10376	10	9.89624	48	57
4	16	9.78999	16	0.21001	9.89385	26	0.10615	0.10386	10	9.89614	44	56
5	20	9.79015	16	0.20985	9.89411	26	0.10589	0.10396	10	9.89604	40	55
6	24	9.79031	16	0.20969	9.89437	26	0.10563	0.10406	10	9.89594	36	54
7	28	9.79047	16	0.20953	9.89463	26	0.10537	0.10416	10	9.89584	32	53
8	32	9.79063	16	0.20937	9.89489	26	0.10511	0.10426	10	9.89574	28	52
9	36	9.79079	16	0.20921	9.89515	26	0.10485	0.10436	10	9.89564	24	51
10	40	9.79095	16	0.20905	9.89541	26	0.10459	0.10446	10	9.89554	20	50
11	44	9.79111	17	0.20889	9.89567	26	0.10433	0.10456	10	9.89544	16	49
12	48	9.79128	16	0.20872	9.89593	26	0.10407	0.10466	10	9.89534	12	48
13	52	9.79144	16	0.20856	9.89619	26	0.10381	0.10476	10	9.89524	8	47
14	56	9.79160	16	0.20840	9.89645	26	0.10355	0.10486	10	9.89514	4	46
15	33	9.79176	16	0.20824	9.89671	26	0.10329	0.10496	9	9.89504	29	45
16	4	9.79192	16	0.20808	9.89697	26	0.10303	0.10505	10	9.89495	56	44
17	8	9.79208	16	0.20792	9.89723	26	0.10277	0.10515	10	9.89485	52	43
18	12	9.79224	16	0.20776	9.89749	26	0.10251	0.10525	10	9.89475	48	42
19	16	9.79240	16	0.20760	9.89775	26	0.10225	0.10535	10	9.89465	44	41
20	20	9.79256	16	0.20744	9.89801	26	0.10199	0.10545	10	9.89455	40	40
21	24	9.79272	16	0.20728	9.89827	26	0.10173	0.10555	10	9.89445	36	39
22	28	9.79288	16	0.20712	9.89853	26	0.10147	0.10565	10	9.89435	32	38
23	32	9.79304	15	0.20696	9.89879	26	0.10121	0.10575	10	9.89425	28	37
24	36	9.79319	16	0.20681	9.89905	26	0.10095	0.10585	10	9.89415	24	36
25	40	9.79335	16	0.20665	9.89931	26	0.10069	0.10595	10	9.89405	20	35
26	44	9.79351	16	0.20649	9.89957	26	0.10043	0.10605	10	9.89395	16	34
27	48	9.79367	16	0.20633	9.89983	26	0.10017	0.10615	10	9.89385	12	33
28	52	9.79383	16	0.20617	9.90009	26	0.09991	0.10625	11	9.89375	8	32
29	56	9.79399	16	0.20601	9.90035	26	0.09965	0.10636	10	9.89364	4	31
30	34	9.79415	16	0.20585	9.90061	25	0.09939	0.10646	10	9.89354	30	30
31	4	9.79431	16	0.20569	9.90086	26	0.09914	0.10656	10	9.89344	56	29
32	8	9.79447	16	0.20553	9.90112	26	0.09888	0.10666	10	9.89334	52	28
33	12	9.79463	15	0.20537	9.90138	26	0.09862	0.10676	10	9.89324	48	27
34	16	9.79478	16	0.20522	9.90164	26	0.09836	0.10686	10	9.89314	44	26
35	20	9.79494	16	0.20506	9.90190	26	0.09810	0.10696	10	9.89304	40	25
36	24	9.79510	16	0.20490	9.90216	26	0.09784	0.10706	10	9.89294	36	24
37	28	9.79526	16	0.20474	9.90242	26	0.09758	0.10716	10	9.89284	32	23
38	32	9.79542	16	0.20458	9.90268	26	0.09732	0.10726	10	9.89274	28	22
39	36	9.79558	15	0.20442	9.90294	26	0.09706	0.10736	10	9.89264	24	21
40	40	9.79573	16	0.20427	9.90320	26	0.09680	0.10746	10	9.89254	20	20
41	44	9.79589	16	0.20411	9.90346	25	0.09654	0.10756	11	9.89244	16	19
42	48	9.79605	16	0.20395	9.90371	26	0.09629	0.10767	10	9.89233	12	18
43	52	9.79621	15	0.20379	9.90397	26	0.09603	0.10777	10	9.89223	8	17
44	56	9.79636	16	0.20364	9.90423	26	0.09577	0.10787	10	9.89213	4	16
45	35	9.79652	16	0.20348	9.90449	26	0.09551	0.10797	10	9.89203	25	15
46	4	9.79668	16	0.20332	9.90475	26	0.09525	0.10807	10	9.89193	56	14
47	8	9.79684	15	0.20316	9.90501	26	0.09499	0.10817	10	9.89183	52	13
48	12	9.79699	16	0.20301	9.90527	26	0.09473	0.10827	11	9.89173	48	12
49	16	9.79715	16	0.20285	9.90553	25	0.09447	0.10838	10	9.89162	44	11
50	20	9.79731	15	0.20269	9.90578	26	0.09422	0.10848	10	9.89152	40	10
51	24	9.79746	16	0.20254	9.90604	26	0.09396	0.10858	10	9.89142	36	9
52	28	9.79762	16	0.20238	9.90630	26	0.09370	0.10868	10	9.89132	32	8
53	32	9.79778	15	0.20222	9.90656	26	0.09344	0.10878	10	9.89122	28	7
54	36	9.79793	16	0.20207	9.90682	26	0.09318	0.10888	11	9.89112	24	6
55	40	9.79809	16	0.20191	9.90708	26	0.09292	0.10899	10	9.89101	20	5
56	44	9.79825	15	0.20175	9.90734	25	0.09266	0.10909	10	9.89091	16	4
57	48	9.79840	16	0.20160	9.9 759	26	0.09241	0.10919	10	9.89081	12	3
58	52	9.79856	16	0.20144	9.90785	26	0.09215	0.10929	11	9.89071	8	2
59	56	9.79872	15	0.20128	9.90811	26	0.09189	0.10940	10	9.89060	4	1
60	36	9.79887		0.20113	9.90837		0.09163	0.10950		9.89050	24	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 51°

P. p.

	16	26
10	3	4
20	5	9
30	8	13
40	11	17
50	13	22
6	2	3
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40	7	7
50	8	9
6	1	1
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8	1	1
9	2	2

	15	25
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50	13	21
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Logarithmos das linhas trigonometricas

T. 26)

39° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	28	9.79887	16	0.20113	9.90837	26	0.09163	0.10950	10	9.89050	24	60
1	4	9.79903	15	0.20097	9.90863	26	0.09137	0.10960	10	9.89040	56	59
2	8	9.79918	16	0.20082	9.90889	25	0.09111	0.10970	10	9.89030	52	58
3	12	9.79934	16	0.20066	9.90914	26	0.09086	0.10980	11	9.89020	48	57
4	16	9.79950	15	0.20050	9.90940	26	0.09060	0.10991	10	9.89009	44	56
5	20	9.79965	16	0.20035	9.90966	26	0.09034	0.11001	10	9.88999	40	55
6	24	9.79981	15	0.20019	9.90992	26	0.09008	0.11011	11	9.88989	36	54
7	28	9.79996	16	0.20004	9.91018	25	0.08982	0.11022	10	9.88978	32	53
8	32	9.80012	15	0.19988	9.91043	26	0.08957	0.11032	10	9.88968	28	52
9	36	9.80027	16	0.19973	9.91069	26	0.08931	0.11042	10	9.88958	24	51
10	40	9.80043	15	0.19957	9.91095	26	0.08905	0.11052	11	9.88948	20	50
11	44	9.80058	16	0.19942	9.91121	26	0.08879	0.11063	10	9.88937	16	49
12	48	9.80074	15	0.19926	9.91147	25	0.08853	0.11073	10	9.88927	12	48
13	52	9.80089	16	0.19911	9.91172	26	0.08828	0.11083	11	9.88917	8	47
14	56	9.80105	15	0.19895	9.91198	26	0.08802	0.11094	10	9.88906	4	46
15	27	9.80120	16	0.19880	9.91224	26	0.08776	0.11104	10	9.88896	23	45
16	4	9.80136	15	0.19864	9.91250	26	0.08750	0.11114	11	9.88886	56	44
17	8	9.80151	15	0.19849	9.91276	25	0.08724	0.11125	10	9.88875	52	43
18	12	9.80166	16	0.19834	9.91301	26	0.08699	0.11135	10	9.88865	48	42
19	16	9.80182	15	0.19818	9.91327	26	0.08673	0.11145	11	9.88855	44	41
20	20	9.80197	16	0.19803	9.91353	26	0.08647	0.11156	10	9.88844	40	40
21	24	9.80213	15	0.19787	9.91379	25	0.08621	0.11166	10	9.88834	36	39
22	28	9.80228	16	0.19772	9.91404	26	0.08596	0.11176	11	9.88824	32	38
23	32	9.80244	15	0.19756	9.91430	26	0.08570	0.11187	10	9.88813	28	37
24	36	9.80259	15	0.19741	9.91456	26	0.08544	0.11197	10	9.88803	24	36
25	40	9.80274	16	0.19726	9.91482	25	0.08518	0.11207	11	9.88793	20	35
26	44	9.80290	15	0.19710	9.91507	26	0.08493	0.11218	10	9.88782	16	34
27	48	9.80305	15	0.19695	9.91533	26	0.08467	0.11228	11	9.88772	12	33
28	52	9.80320	16	0.19680	9.91559	26	0.08441	0.11239	10	9.88761	8	32
29	56	9.80336	15	0.19664	9.91585	25	0.08415	0.11249	10	9.88751	4	31
30	28	9.80351	15	0.19649	9.91610	26	0.08390	0.11259	11	9.88741	22	30
31	4	9.80366	16	0.19634	9.91636	26	0.08364	0.11270	10	9.88730	56	29
32	8	9.80382	15	0.19618	9.91662	26	0.08338	0.11280	11	9.88720	52	28
33	12	9.80397	15	0.19603	9.91688	25	0.08312	0.11291	10	9.88709	48	27
34	16	9.80412	16	0.19588	9.91713	26	0.08287	0.11301	11	9.88699	44	26
35	20	9.80428	15	0.19572	9.91739	26	0.08261	0.11312	10	9.88688	40	25
36	24	9.80443	15	0.19557	9.91765	26	0.08235	0.11322	10	9.88678	36	24
37	28	9.80458	15	0.19542	9.91791	25	0.08209	0.11332	11	9.88668	32	23
38	32	9.80473	16	0.19527	9.91816	26	0.08184	0.11343	10	9.88657	28	22
39	36	9.80489	15	0.19511	9.91842	26	0.08158	0.11353	11	9.88647	24	21
40	40	9.80504	15	0.19496	9.91868	25	0.08132	0.11364	10	9.88636	20	20
41	44	9.80519	15	0.19481	9.91893	26	0.08107	0.11374	11	9.88626	16	19
42	48	9.80534	16	0.19466	9.91919	26	0.08081	0.11385	10	9.88615	12	18
43	52	9.80550	15	0.19450	9.91945	26	0.08055	0.11395	11	9.88605	8	17
44	56	9.80565	15	0.19435	9.91971	25	0.08029	0.11406	10	9.88594	4	16
45	29	9.80580	15	0.19420	9.91996	26	0.08004	0.11416	11	9.88584	21	15
46	4	9.80595	15	0.19405	9.92022	26	0.07978	0.11427	10	9.88573	56	14
47	8	9.80610	15	0.19390	9.92048	25	0.07952	0.11437	11	9.88563	52	13
48	12	9.80625	16	0.19375	9.92073	26	0.07927	0.11448	10	9.88552	48	12
49	16	9.80641	15	0.19359	9.92099	26	0.07901	0.11458	11	9.88542	44	11
50	20	9.80656	15	0.19344	9.92125	25	0.07875	0.11469	10	9.88531	40	10
51	24	9.80671	15	0.19329	9.92150	26	0.07850	0.11479	11	9.88521	36	9
52	28	9.80686	15	0.19314	9.92176	26	0.07824	0.11490	11	9.88510	32	8
53	32	9.80701	15	0.19299	9.92202	25	0.07798	0.11501	10	9.88499	28	7
54	36	9.80716	15	0.19284	9.92227	26	0.07773	0.11511	11	9.88489	24	6
55	40	9.80731	15	0.19269	9.92253	26	0.07747	0.11522	10	9.88478	20	5
56	44	9.80746	16	0.19254	9.92279	25	0.07721	0.11532	11	9.88468	16	4
57	48	9.80762	15	0.19238	9.92304	26	0.07696	0.11543	10	9.88457	12	3
58	52	9.80777	15	0.19223	9.92330	26	0.07670	0.11553	11	9.88447	8	2
59	56	9.80792	15	0.19208	9.92356	25	0.07644	0.11564	11	9.88436	4	1
60	40	9.80807		0.19193	9.92381		0.07619	0.11575		9.88425	20	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 50°

P. p.

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Logarithmos das linhas trigonometricas

T. 26)

40° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	40	9.80807	15	0.19193	9.92381	26	0.07619	0.11575	10	9.88425	20	60
1	4	9.80822	15	0.19178	9.92407	26	0.07593	0.11585	11	9.88415	56	59
2	8	9.80837	15	0.19163	9.92433	25	0.07567	0.11596	10	9.88404	52	58
3	12	9.80852	15	0.19148	9.92458	26	0.07542	0.11606	11	9.88394	48	57
4	16	9.80867	15	0.19133	9.92484	26	0.07516	0.11617	11	9.88383	44	56
5	20	9.80882	15	0.19118	9.92510	25	0.07490	0.11628	10	9.88372	40	55
6	24	9.80897	15	0.19103	9.92535	26	0.07465	0.11638	11	9.88362	36	54
7	28	9.80912	15	0.19088	9.92561	26	0.07439	0.11649	11	9.88351	32	53
8	32	9.80927	15	0.19073	9.92587	25	0.07413	0.11660	10	9.88340	28	52
9	36	9.80942	15	0.19058	9.92612	26	0.07388	0.11670	11	9.88330	24	51
10	40	9.80957	15	0.19043	9.92638	25	0.07362	0.11681	11	9.88319	20	50
11	44	9.80972	15	0.19028	9.92663	26	0.07337	0.11692	10	9.88308	16	49
12	48	9.80987	15	0.19013	9.92689	26	0.07311	0.11702	11	9.88298	12	48
13	52	9.81002	15	0.18998	9.92715	25	0.07285	0.11713	11	9.88287	8	47
14	56	9.81017	15	0.18983	9.92740	26	0.07260	0.11724	10	9.88276	4	46
15	41	9.81032	15	0.18968	9.92766	26	0.07234	0.11734	11	9.88266	19	45
16	4	9.81047	14	0.18953	9.92792	25	0.07208	0.11745	11	9.88255	56	44
17	8	9.81061	15	0.18939	9.92817	26	0.07183	0.11756	10	9.88244	52	43
18	12	9.81076	15	0.18924	9.92843	25	0.07157	0.11766	11	9.88234	48	42
19	16	9.81091	15	0.18909	9.92868	26	0.07132	0.11777	11	9.88223	44	41
20	20	9.81106	15	0.18894	9.92894	26	0.07106	0.11788	11	9.88212	40	40
21	24	9.81121	15	0.18879	9.92920	25	0.07080	0.11799	10	9.88201	36	39
22	28	9.81136	15	0.18864	9.92945	26	0.07055	0.11809	11	9.88191	32	38
23	32	9.81151	15	0.18849	9.92971	25	0.07029	0.11820	11	9.88180	28	37
24	36	9.81166	14	0.18834	9.92996	26	0.07004	0.11831	11	9.88169	24	36
25	40	9.81180	15	0.18820	9.93022	26	0.06978	0.11842	10	9.88158	20	35
26	44	9.81195	15	0.18805	9.93048	25	0.06952	0.11852	11	9.88148	16	34
27	48	9.81210	15	0.18790	9.93073	26	0.06927	0.11863	11	9.88137	12	33
28	52	9.81225	15	0.18775	9.93099	25	0.06901	0.11874	11	9.88126	8	32
29	56	9.81240	14	0.18760	9.93124	26	0.06876	0.11885	10	9.88115	4	31
30	42	9.81254	15	0.18746	9.93150	25	0.06850	0.11895	11	9.88105	18	30
31	4	9.81269	15	0.18731	9.93175	26	0.06825	0.11906	11	9.88094	56	29
32	8	9.81284	15	0.18716	9.93201	26	0.06799	0.11917	11	9.88083	52	28
33	12	9.81299	15	0.18701	9.93227	25	0.06773	0.11928	11	9.88072	48	27
34	16	9.81314	14	0.18686	9.93252	26	0.06748	0.11939	10	9.88061	44	26
35	20	9.81328	15	0.18672	9.93278	25	0.06722	0.11949	11	9.88051	40	25
36	24	9.81343	15	0.18657	9.93303	26	0.06697	0.11960	11	9.88040	36	24
37	28	9.81358	14	0.18642	9.93329	25	0.06671	0.11971	11	9.88029	32	23
38	32	9.81372	15	0.18628	9.93354	26	0.06646	0.11982	11	9.88018	28	22
39	36	9.81387	15	0.18613	9.93380	26	0.06620	0.11993	11	9.88007	24	21
40	40	9.81402	15	0.18598	9.93406	25	0.06594	0.12004	11	9.87996	20	20
41	44	9.81417	14	0.18583	9.93431	26	0.06569	0.12015	10	9.87985	16	19
42	48	9.81431	15	0.18569	9.93457	25	0.06543	0.12025	11	9.87975	12	18
43	52	9.81446	15	0.18554	9.93482	26	0.06518	0.12036	11	9.87964	8	17
44	56	9.81461	14	0.18539	9.93508	25	0.06492	0.12047	11	9.87953	4	16
45	43	9.81475	15	0.18525	9.93533	26	0.06467	0.12058	11	9.87942	17	15
46	4	9.81490	15	0.18510	9.93559	25	0.06441	0.12069	11	9.87931	56	14
47	8	9.81505	14	0.18495	9.93584	26	0.06416	0.12080	11	9.87920	52	13
48	12	9.81519	15	0.18481	9.93610	26	0.06390	0.12091	11	9.87909	48	12
49	16	9.81534	15	0.18466	9.93636	25	0.06364	0.12102	11	9.87898	44	11
50	20	9.81549	14	0.18451	9.93661	26	0.06339	0.12113	10	9.87887	40	10
51	24	9.81563	15	0.18437	9.93687	25	0.06313	0.12123	11	9.87877	36	9
52	28	9.81578	14	0.18422	9.93712	26	0.06288	0.12134	11	9.87866	32	8
53	32	9.81592	15	0.18408	9.93738	25	0.06262	0.12145	11	9.87855	28	7
54	36	9.81607	15	0.18393	9.93763	26	0.06237	0.12156	11	9.87844	24	6
55	40	9.81622	14	0.18378	9.93789	25	0.06211	0.12167	11	9.87833	20	5
56	44	9.81636	15	0.18364	9.93814	26	0.06186	0.12178	11	9.87822	16	4
57	48	9.81651	14	0.18349	9.93840	25	0.06160	0.12189	11	9.87811	12	3
58	52	9.81665	15	0.18335	9.93865	26	0.06135	0.12200	11	9.87800	8	2
59	56	9.81680	14	0.18320	9.93891	25	0.06109	0.12211	11	9.87789	4	1
60	44	9.81694		0.18306	9.93916		0.06084	0.12222		9.87778	16	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 49°

P. p.

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9	2	2

	14	25
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Logarithmos das linhas trigonometricas

T. 26)

41° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	44	9.81694	15	0.18306	9.93916	26	0.06084	0.12222	11	9.87778	16	60
1	4	9.81709	14	0.18291	9.93942	25	0.06058	0.12233	11	9.87767	56	59
2	8	9.81723	15	0.18277	9.93967	26	0.06033	0.12244	11	9.87756	52	58
3	12	9.81738	14	0.18262	9.93993	25	0.06007	0.12255	11	9.87745	48	57
4	16	9.81752	15	0.18248	9.94018	26	0.05902	0.12266	11	9.87734	44	56
5	20	9.81767	14	0.18233	9.94044	25	0.05956	0.12277	11	9.87723	40	55
6	24	9.81781	15	0.18219	9.94069	26	0.05931	0.12288	11	9.87712	36	54
7	28	9.81796	14	0.18204	9.94095	25	0.05905	0.12299	11	9.87701	32	53
8	32	9.81810	15	0.18190	9.94120	26	0.05880	0.12310	11	9.87690	28	52
9	36	9.81825	14	0.18175	9.94146	25	0.05854	0.12321	11	9.87679	24	51
10	40	9.81839	15	0.18161	9.94171	26	0.05829	0.12332	11	9.87668	20	50
11	44	9.81854	14	0.18146	9.94197	25	0.05803	0.12343	11	9.87657	16	49
12	48	9.81868	14	0.18132	9.94222	26	0.05778	0.12354	11	9.87646	12	48
13	52	9.81882	15	0.18118	9.94248	25	0.05752	0.12365	11	9.87635	8	47
14	56	9.81897	14	0.18103	9.94273	26	0.05727	0.12376	11	9.87624	4	46
15	45	9.81911	15	0.18089	9.94299	25	0.05701	0.12387	12	9.87613	15	45
16	4	9.81926	14	0.18074	9.94324	26	0.05676	0.12399	11	9.87601	56	44
17	8	9.81940	15	0.18060	9.94350	25	0.05650	0.12410	11	9.87590	52	43
18	12	9.81955	14	0.18045	9.94375	26	0.05625	0.12421	11	9.87579	48	42
19	16	9.81969	14	0.18031	9.94401	25	0.05599	0.12432	11	9.87568	44	41
20	20	9.81983	15	0.18017	9.94426	26	0.05574	0.12443	11	9.87557	40	40
21	24	9.81998	14	0.18002	9.94452	25	0.05548	0.12454	11	9.87546	36	39
22	28	9.82012	14	0.17988	9.94477	26	0.05523	0.12465	11	9.87535	32	38
23	32	9.82026	15	0.17974	9.94503	25	0.05497	0.12476	11	9.87524	28	37
24	36	9.82041	14	0.17959	9.94528	26	0.05472	0.12487	12	9.87513	24	36
25	40	9.82055	14	0.17945	9.94554	25	0.05446	0.12499	11	9.87501	20	35
26	44	9.82069	15	0.17931	9.94579	25	0.05421	0.12510	11	9.87490	16	34
27	48	9.82084	14	0.17916	9.94604	26	0.05396	0.12521	11	9.87479	12	33
28	52	9.82098	14	0.17902	9.94630	25	0.05370	0.12532	11	9.87468	8	32
29	56	9.82112	14	0.17888	9.94655	26	0.05345	0.12543	11	9.87457	4	31
30	46	9.82126	15	0.17874	9.94681	25	0.05319	0.12554	12	9.87446	14	30
31	4	9.82141	14	0.17859	9.94706	26	0.05294	0.12566	11	9.87434	56	29
32	8	9.82155	14	0.17845	9.94732	25	0.05268	0.12577	11	9.87423	52	28
33	12	9.82169	15	0.17831	9.94757	26	0.05243	0.12588	11	9.87412	48	27
34	16	9.82184	14	0.17816	9.94783	25	0.05217	0.12599	11	9.87401	44	26
35	20	9.82198	14	0.17802	9.94808	26	0.05192	0.12610	12	9.87390	40	25
36	24	9.82212	14	0.17788	9.94834	25	0.05166	0.12622	11	9.87378	36	24
37	28	9.82226	14	0.17774	9.94859	25	0.05141	0.12633	11	9.87367	32	23
38	32	9.82240	15	0.17760	9.94884	26	0.05116	0.12644	11	9.87356	28	22
39	36	9.82255	14	0.17745	9.94910	25	0.05090	0.12655	11	9.87345	24	21
40	40	9.82269	14	0.17731	9.94935	26	0.05065	0.12666	12	9.87334	20	20
41	44	9.82283	14	0.17717	9.94961	25	0.05039	0.12678	11	9.87322	16	19
42	48	9.82297	14	0.17703	9.94986	26	0.05014	0.12689	11	9.87311	12	18
43	52	9.82311	15	0.17689	9.95012	25	0.04988	0.12700	12	9.87300	8	17
44	56	9.82326	14	0.17674	9.95037	25	0.04963	0.12712	11	9.87288	4	16
45	47	9.82340	14	0.17660	9.95062	26	0.04938	0.12723	11	9.87277	13	15
46	4	9.82354	14	0.17646	9.95088	25	0.04912	0.12734	11	9.87266	56	14
47	8	9.82368	14	0.17632	9.95113	26	0.04887	0.12745	12	9.87255	52	13
48	12	9.82382	14	0.17618	9.95139	25	0.04861	0.12757	11	9.87243	48	12
49	16	9.82396	14	0.17604	9.95164	26	0.04836	0.12768	11	9.87232	44	11
50	20	9.82410	14	0.17590	9.95190	25	0.04810	0.12779	12	9.87221	40	10
51	24	9.82424	15	0.17576	9.95215	25	0.04785	0.12791	11	9.87209	36	9
52	28	9.82439	14	0.17561	9.95240	26	0.04760	0.12802	11	9.87198	32	8
53	32	9.82453	14	0.17547	9.95266	25	0.04734	0.12813	12	9.87187	28	7
54	36	9.82467	14	0.17533	9.95291	26	0.04709	0.12825	11	9.87175	24	6
55	40	9.82481	14	0.17519	9.95317	25	0.04683	0.12836	11	9.87164	20	5
56	44	9.82495	14	0.17505	9.95342	26	0.04658	0.12847	12	9.87153	16	4
57	48	9.82509	14	0.17491	9.95368	25	0.04632	0.12859	11	9.87141	12	3
58	52	9.82523	14	0.17477	9.95393	25	0.04607	0.12870	11	9.87130	8	2
59	56	9.82537	14	0.17463	9.95418	26	0.04582	0.12881	12	9.87919	4	1
60	48	9.82551		0.17449	9.95444		0.04556	0.12893		9.87107	12	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 48°

P. p.

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10	3	4
20	5	9
30	8	13
40	10	17
50	13	22
6	2	3
7	2	3
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20	4	4
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6	1	1
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′	14	25
10	2	4
20	5	8
30	7	13
40	9	17
50	12	21
6	1	3
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Logarithmos das linhas trigonometricas

T. 26)

42° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	48	9.82551	14	0.17449	9.95444	25	0.04556	0.12893	11	9.87107	12	60
1	4	9.82565	14	0.17434	9.95469	26	0.04531	0.12904	11	9.87096	56	59
2	8	9.82579	14	0.17421	9.95495	25	0.04505	0.12915	12	9.87085	52	58
3	12	9.82593	14	0.17407	9.95520	25	0.04480	0.12927	11	9.87073	48	57
4	16	9.82607	14	0.17393	9.95545	26	0.04455	0.12938	11	9.87062	44	56
5	20	9.82621	14	0.17379	9.95571	25	0.04429	0.12950	11	9.87050	40	55
6	24	9.82635	14	0.17365	9.95596	26	0.04404	0.12961	11	9.87039	36	54
7	28	9.82649	14	0.17351	9.95622	25	0.04378	0.12972	12	9.87028	32	53
8	32	9.82663	14	0.17337	9.95647	25	0.04353	0.12984	11	9.87016	28	52
9	36	9.82677	14	0.17323	9.95672	26	0.04328	0.12995	12	9.87005	24	51
10	40	9.82691	14	0.17309	9.95698	25	0.04302	0.13007	11	9.86993	20	50
11	44	9.82705	14	0.17295	9.95723	25	0.04277	0.13018	12	9.86982	16	49
12	48	9.82719	14	0.17281	9.95748	26	0.04252	0.13030	11	9.86970	12	48
13	52	9.82733	14	0.17267	9.95774	25	0.04226	0.13041	12	9.86959	8	47
14	56	9.82747	14	0.17253	9.95799	26	0.04201	0.13053	11	9.86947	4	46
15	49	9.82761	14	0.17239	9.95825	25	0.04175	0.13064	12	9.86936	11	45
16	4	9.82775	13	0.17225	9.95850	25	0.04150	0.13076	11	9.86924	56	44
17	8	9.82788	14	0.17212	9.95875	26	0.04125	0.13087	11	9.86913	52	43
18	12	9.82802	14	0.17198	9.95901	25	0.04099	0.13098	12	9.86902	48	42
19	16	9.82816	14	0.17184	9.95926	26	0.04074	0.13110	11	9.86890	44	41
20	20	9.82830	14	0.17170	9.95952	25	0.04048	0.13121	12	9.86879	40	40
21	24	9.82844	14	0.17156	9.95977	25	0.04023	0.13133	12	9.86867	36	39
22	28	9.82858	14	0.17142	9.96002	26	0.03998	0.13145	11	9.86855	32	38
23	32	9.82872	13	0.17128	9.96028	25	0.03972	0.13156	12	9.86844	28	37
24	36	9.82885	14	0.17115	9.96053	25	0.03947	0.13168	11	9.86832	24	36
25	40	9.82899	14	0.17101	9.96078	26	0.03922	0.13179	12	9.86821	20	35
26	44	9.82913	14	0.17087	9.96104	25	0.03896	0.13191	11	9.86809	16	34
27	48	9.82927	14	0.17073	9.96129	26	0.03871	0.13202	12	9.86798	12	33
28	52	9.82941	14	0.17059	9.96155	25	0.03845	0.13214	11	9.86786	8	32
29	56	9.82955	13	0.17045	9.96180	25	0.03820	0.13225	12	9.86775	4	31
30	50	9.82968	14	0.17032	9.96205	26	0.03795	0.13237	11	9.86763	10	30
31	4	9.82982	14	0.17018	9.96231	25	0.03769	0.13248	12	9.86752	56	29
32	8	9.82996	14	0.17004	9.96256	25	0.03744	0.13260	12	9.86740	52	28
33	12	9.83010	13	0.16990	9.96281	26	0.03719	0.13272	11	9.86728	48	27
34	16	9.83023	14	0.16977	9.96307	25	0.03693	0.13283	12	9.86717	44	26
35	20	9.83037	14	0.16963	9.96332	25	0.03668	0.13295	11	9.86705	40	25
36	24	9.83051	14	0.16949	9.96357	26	0.03643	0.13306	12	9.86694	36	24
37	28	9.83065	13	0.16935	9.96383	25	0.03617	0.13313	12	9.86682	32	23
38	32	9.83078	14	0.16922	9.96408	25	0.03592	0.13330	11	9.86670	28	22
39	36	9.83092	14	0.16908	9.96433	26	0.03567	0.13341	12	9.86659	24	21
40	40	9.83106	14	0.16894	9.96459	25	0.03541	0.13353	12	9.86647	20	20
41	44	9.83120	13	0.16880	9.96484	26	0.03516	0.13365	11	9.86635	16	19
42	48	9.83133	14	0.16867	9.96510	25	0.03490	0.13376	12	9.86624	12	18
43	52	9.83147	14	0.16853	9.96535	25	0.03465	0.13388	12	9.86612	8	17
44	56	9.83161	13	0.16839	9.96560	26	0.03440	0.13400	11	9.86600	4	16
45	51	9.83174	14	0.16826	9.96586	25	0.03414	0.13411	12	9.86589	0	15
46	4	9.83188	14	0.16812	9.96611	25	0.03389	0.13423	12	9.86577	56	14
47	8	9.83202	13	0.16798	9.96636	26	0.03364	0.13435	11	9.86565	52	13
48	12	9.83215	14	0.16785	9.96662	25	0.03338	0.13446	12	9.86554	48	12
49	16	9.83229	13	0.16771	9.96687	25	0.03313	0.13458	12	9.86542	44	11
50	20	9.83242	14	0.16758	9.96712	26	0.03288	0.13470	12	9.86530	40	10
51	24	9.83256	14	0.16744	9.96738	25	0.03262	0.13482	11	9.86518	36	9
52	28	9.83270	13	0.16730	9.96763	25	0.03237	0.13493	12	9.86507	32	8
53	32	9.83283	14	0.16717	9.96788	26	0.03212	0.13505	12	9.86495	28	7
54	36	9.83297	13	0.16703	9.96814	25	0.03186	0.13517	11	9.86483	24	6
55	40	9.83310	14	0.16690	9.96839	25	0.03161	0.13528	12	9.86472	20	5
56	44	9.83324	14	0.16676	9.96864	26	0.03136	0.13540	12	9.86460	16	4
57	48	9.83338	13	0.16662	9.96890	25	0.03110	0.13552	12	9.86448	12	3
58	52	9.83351	14	0.16649	9.96915	25	0.03085	0.13564	11	9.86436	8	2
59	56	9.83365	13	0.16635	9.96940	26	0.03060	0.13575	12	9.86425	4	1
60	52	9.83378		0.16622	9.96966		0.03034	0.13587		9.86413	0	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 47°

P. p.

	14	26
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20	4	4
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7	1	1
8	1	2
9	2	2

	13	25
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30	7	13
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50	11	21
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8	2	3
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Logarithmos das linhas trigonometricas

T. 26)

43° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	52	9.83378	14	0.16622	9.96966	25	0.03034	0.13587	12	9.86413	8	60
1	4	9.83392	13	0.16608	9.96991	25	0.03009	0.13599	12	9.86401	56	59
2	8	9.83405	14	0.16595	9.97016	26	0.02984	0.13611	12	9.86389	52	58
3	12	9.83419	13	0.16581	9.97042	25	0.02958	0.13623	11	9.86377	48	57
4	16	9.83432	14	0.16568	9.97067	25	0.02933	0.13634	12	9.86366	44	56
5	20	9.83446	13	0.16554	9.97092	26	0.02908	0.13646	12	9.86354	40	55
6	24	9.83459	14	0.16541	9.97118	25	0.02882	0.13658	12	9.86342	36	54
7	28	9.83473	13	0.16527	9.97143	25	0.02857	0.13670	12	9.86330	32	53
8	32	9.83486	14	0.16514	9.97168	25	0.02832	0.13682	12	9.86318	28	52
9	36	9.83500	13	0.16500	9.97193	26	0.02807	0.13694	11	9.86306	24	51
10	40	9.83513	14	0.16487	9.97219	25	0.02781	0.13705	12	9.86295	20	50
11	44	9.83527	13	0.16473	9.97244	25	0.02756	0.13717	12	9.86283	16	49
12	48	9.83540	14	0.16460	9.97269	26	0.02731	0.13729	12	9.86271	12	48
13	52	9.83554	13	0.16446	9.97295	25	0.02705	0.13741	12	9.86259	8	47
14	56	9.83567	14	0.16433	9.97320	25	0.02680	0.13753	12	9.86247	4	46
15	53	9.83581	13	0.16419	9.97345	26	0.02655	0.13765	12	9.86235	7	45
16	4	9.83594	14	0.16406	9.97371	25	0.02629	0.13777	12	9.86223	56	44
17	8	9.83608	13	0.16392	9.97396	25	0.02604	0.13789	11	9.86211	52	43
18	12	9.83621	13	0.16379	9.97421	26	0.02579	0.13800	12	9.86200	48	42
19	16	9.83634	14	0.16366	9.97447	25	0.02553	0.13812	12	9.86188	44	41
20	20	9.83648	13	0.16352	9.97472	25	0.02528	0.13824	12	9.86176	40	40
21	24	9.83661	13	0.16339	9.97497	26	0.02503	0.13836	12	9.86164	36	39
22	28	9.83674	14	0.16320	9.97523	25	0.02477	0.13848	12	9.86152	32	38
23	32	9.83688	13	0.16312	9.97548	25	0.02452	0.13860	12	9.86140	28	37
24	36	9.83701	14	0.16299	9.97573	25	0.02427	0.13872	12	9.86128	24	36
25	40	9.83715	13	0.16285	9.97598	26	0.02402	0.13884	12	9.86116	20	35
26	44	9.83728	13	0.16272	9.97624	25	0.02376	0.13896	12	9.86104	16	34
27	48	9.83741	14	0.16259	9.97649	25	0.02351	0.13908	12	9.86092	12	33
28	52	9.83755	13	0.16245	9.97674	26	0.02326	0.13920	12	9.86080	8	32
29	56	9.83768	13	0.16232	9.97700	25	0.02300	0.13932	12	9.86068	4	31
30	54	9.83781	14	0.16219	9.97725	25	0.02275	0.13944	12	9.86056	8	30
31	4	9.83795	13	0.16205	9.97750	26	0.02250	0.13956	12	9.86044	56	29
32	8	9.83808	13	0.16192	9.97776	25	0.02224	0.13968	12	9.86032	52	28
33	12	9.83821	13	0.16179	9.97801	25	0.02199	0.13980	12	9.86020	48	27
34	16	9.83834	14	0.16166	9.97826	25	0.02174	0.13992	12	9.86008	44	26
35	20	9.83848	13	0.16152	9.97851	26	0.02149	0.14004	12	9.85996	40	25
36	24	9.83861	13	0.16139	9.97877	25	0.02123	0.14016	12	9.85984	36	24
37	28	9.83874	13	0.16126	9.97902	25	0.02098	0.14028	12	9.85972	32	23
38	32	9.83887	14	0.16113	9.97927	26	0.02073	0.14040	12	9.85960	28	22
39	36	9.83901	13	0.16099	9.97953	25	0.02047	0.14052	12	9.85948	24	21
40	40	9.83914	13	0.16086	9.97978	25	0.02022	0.14064	12	9.85936	20	20
41	44	9.83927	13	0.16073	9.98003	26	0.01997	0.14076	12	9.85924	16	19
42	48	9.83940	14	0.16060	9.98029	25	0.01971	0.14088	12	9.85912	12	18
43	52	9.83954	13	0.16046	9.98054	25	0.01946	0.14100	12	9.85900	8	17
44	56	9.83967	13	0.16033	9.98079	25	0.01921	0.14112	12	9.85888	4	16
45	55	9.83980	13	0.16020	9.98104	26	0.01896	0.14124	12	9.85876	5	15
46	4	9.83993	13	0.16007	9.98130	25	0.01870	0.14136	13	9.85864	56	14
47	8	9.84006	14	0.15994	9.98155	25	0.01845	0.14149	12	9.85851	52	13
48	12	9.84020	13	0.15980	9.98180	26	0.01820	0.14161	12	9.85839	48	12
49	16	9.84033	13	0.15967	9.98206	25	0.01794	0.14173	12	9.85827	44	11
50	20	9.84046	13	0.15954	9.98231	25	0.01769	0.14185	12	9.85815	40	10
51	24	9.84059	13	0.15941	9.98256	25	0.01744	0.14197	12	9.85803	36	9
52	28	9.84072	13	0.15928	9.98281	26	0.01719	0.14209	12	9.85791	32	8
53	32	9.84085	13	0.15915	9.98307	25	0.01693	0.14221	13	9.85779	28	7
54	36	9.84098	14	0.15902	9.98332	25	0.01668	0.14234	12	9.85766	24	6
55	40	9.84112	13	0.15888	9.98357	26	0.01643	0.14246	12	9.85754	20	5
56	44	9.84125	13	0.15875	9.98383	25	0.01617	0.14258	12	9.85742	16	4
57	48	9.84138	13	0.15862	9.98408	25	0.01592	0.14270	12	9.85730	12	3
58	52	9.84151	13	0.15849	9.98433	25	0.01567	0.14282	12	9.85718	8	2
59	56	9.84164	13	0.15836	9.98458	26	0.01542	0.14294	13	9.85706	4	1
60	58	9.84177		0.15823	9.98484		0.01516	0.14307		9.85693	4	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 46°

P. p.

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20	5	9
30	7	13
40	9	17
50	12	22
6	1	3
7	2	3
8	2	3
9	2	4

″	11	12
10	2	2
20	4	4
30	6	6
40	7	8
50	9	10
6	1	1
7	1	1
8	1	2
9	2	2

″	13	25
10	2	4
20	4	8
30	7	13
40	9	17
50	11	21
6	1	3
7	2	3
8	2	3
9	2	4

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Logarithmos das linhas trigonometricas

T. 26)

44° ′	2h m. s.	Sen.	D	Cosec.	Tang.	D	Cotg.	Sec.	D	Cos.	m. s.	′
0	56	9.84177	13	0.15823	9.98484	25	0.01516	0.14307	12	9.85693	4	60
1	4	9.84190	13	0.15810	9.98509	25	0.01491	0.14319	12	9.85681	56	59
2	8	9.84203	13	0.15797	9.98534	26	0.01466	0.14331	12	9.85669	52	58
3	12	9.84216	13	0.15784	9.98560	25	0.01440	0.14343	12	9.85657	48	57
4	16	9.84229	13	0.15771	9.98585	25	0.01415	0.14355	13	9.85645	44	56
5	20	9.84242	13	0.15758	9.98610	25	0.01390	0.14368	12	9.85632	40	55
6	24	9.84255	14	0.15745	9.98635	26	0.01365	0.14380	12	9.85620	36	54
7	28	9.84269	13	0.15731	9.98661	25	0.01339	0.14392	12	9.85608	32	53
8	32	9.84282	13	0.15718	9.98686	25	0.01314	0.14404	13	9.85596	28	52
9	36	9.84295	13	0.15705	9.98711	26	0.01289	0.14417	12	9.85583	24	51
10	40	9.84308	13	0.15692	9.98737	25	0.01263	0.14429	12	9.85571	20	50
11	44	9.84321	13	0.15679	9.98762	25	0.01238	0.14441	12	9.85559	16	49
12	48	9.84334	13	0.15666	9.98787	25	0.01213	0.14453	13	9.85547	12	48
13	52	9.84347	13	0.15653	9.98812	26	0.01188	0.14466	12	9.85534	8	47
14	56	9.84360	13	0.15640	9.98838	25	0.01162	0.14478	12	9.85522	4	46
15	57	9.84373	12	0.15627	9.98863	25	0.01137	0.14490	13	9.85510	3	45
16	4	9.84385	13	0.15615	9.98888	25	0.01112	0.14503	12	9.85497	56	44
17	8	9.84398	13	0.15602	9.98913	26	0.01087	0.14515	12	9.85485	52	43
18	12	9.84411	13	0.15589	9.98939	25	0.01061	0.14527	13	9.85473	48	42
19	16	9.84424	13	0.15576	9.98964	25	0.01036	0.14540	12	9.85460	44	41
20	20	9.84437	13	0.15563	9.98989	26	0.01011	0.14552	12	9.85448	40	40
21	24	9.84450	13	0.15550	9.99015	25	0.00985	0.14564	13	9.85436	36	39
22	28	9.84463	13	0.15537	9.99040	25	0.00960	0.14577	12	9.85423	32	38
23	32	9.84476	13	0.15524	9.99065	25	0.00935	0.14589	12	9.85411	28	37
24	36	9.84489	13	0.15511	9.99090	26	0.00910	0.14601	13	9.85399	24	36
25	40	9.84502	13	0.15498	9.99116	25	0.00884	0.14614	12	9.85386	20	35
26	44	9.84515	13	0.15485	9.99141	25	0.00859	0.14626	13	9.85374	16	34
27	48	9.84528	12	0.15472	9.99166	25	0.00834	0.14639	12	9.85361	12	33
28	52	9.84540	13	0.15460	9.99191	26	0.00809	0.14651	12	9.85349	8	32
29	56	9.84553	13	0.15447	9.99217	25	0.00783	0.14663	13	9.85337	4	31
30	58	9.84566	13	0.15434	9.99242	25	0.00758	0.14676	12	9.85324	2	30
31	4	9.84579	13	0.15421	9.99267	26	0.00733	0.14688	13	9.85312	56	29
32	8	9.84592	13	0.15408	9.99293	25	0.00707	0.14701	12	9.85299	52	28
33	12	9.84605	13	0.15395	9.99318	25	0.00682	0.14713	13	9.85287	48	27
34	16	9.84618	12	0.15382	9.99343	25	0.00657	0.14726	12	9.85274	44	26
35	20	9.84630	13	0.15370	9.99368	26	0.00632	0.14738	12	9.85262	40	25
36	24	9.84643	13	0.15357	9.99394	25	0.00606	0.14750	13	9.85250	36	24
37	28	9.84656	13	0.15344	9.99419	25	0.00581	0.14763	12	9.85237	32	23
38	32	9.84669	13	0.15331	9.99444	25	0.00556	0.14775	13	9.85225	28	22
39	36	9.84682	12	0.15318	9.99469	26	0.00531	0.14788	12	9.85212	24	21
40	40	9.84694	13	0.15306	9.99495	25	0.00505	0.14800	13	9.85200	20	20
41	44	9.84707	13	0.15293	9.99520	25	0.00480	0.14813	12	9.85187	16	19
42	48	9.84720	13	0.15280	9.99545	25	0.00455	0.14825	13	9.85175	12	18
43	52	9.84733	12	0.15267	9.99570	26	0.00430	0.14838	12	9.85162	8	17
44	56	9.84745	13	0.15255	9.99596	25	0.00404	0.14850	13	9.85150	4	16
45	59	9.84758	13	0.15242	9.99621	25	0.00379	0.14863	12	9.85137	1	15
46	4	9.84771	13	0.15229	9.99646	26	0.00354	0.14875	13	9.85125	56	14
47	8	9.84784	12	0.15216	9.99672	25	0.00328	0.14888	12	9.85112	52	13
48	12	9.84796	13	0.15204	9.99697	25	0.00303	0.14900	13	9.85100	48	12
49	16	9.84809	13	0.15191	9.99722	25	0.00278	0.14913	13	9.85087	44	11
50	20	9.84822	13	0.15178	9.99747	26	0.00253	0.14926	12	9.85074	40	10
51	24	9.84835	12	0.15165	9.99773	25	0.00227	0.14938	13	9.85062	36	9
52	28	9.84847	13	0.15153	9.99798	25	0.00202	0.14951	12	9.85049	32	8
53	32	9.84860	13	0.15140	9.99823	25	0.00177	0.14963	13	9.85037	28	7
54	36	9.84873	12	0.15127	9.99848	26	0.00152	0.14976	12	9.85024	24	6
55	40	9.84885	13	0.15115	9.99874	25	0.00126	0.14988	13	9.85012	20	5
56	44	9.84898	13	0.15102	9.99899	25	0.00101	0.15001	13	9.84999	16	4
57	48	9.84911	12	0.15089	9.99924	25	0.00076	0.15014	12	9.84986	12	3
58	52	9.84923	13	0.15077	9.99949	26	0.00051	0.15026	13	9.84974	8	2
59	56	9.84936	13	0.15064	9.99975	25	0.00025	0.15039	12	9.84961	4	1
60	60	9.84949		0.15051	10.00000		0.00000	0.15051		9.84949	0	0
′	m. s.	Cos.	D	Sec.	Cotg.	D	Tang.	Cosec.	D	Sen.	m. s. 3h	′ 45°

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Senos naturaes

T. 27)

′	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10	11°	12°	′
0	00000	01745	03490	05234	06976	08716	10453	12187	13917	15643	17365	19081	20791	60
1	00029	01774	03519	05263	07005	08745	10482	12216	13946	15672	17393	19109	20820	59
2	00058	01803	03548	05292	07034	08774	10511	12245	13975	15701	17422	19138	20848	58
3	00087	01832	03577	05321	07063	08803	10540	12274	14004	15730	17451	19167	20877	57
4	00116	01862	03606	05350	07092	08831	10569	12302	14033	15758	17479	19195	20905	56
5	00145	01891	03635	05379	07121	08860	10597	12331	14061	15787	17508	19224	20933	55
6	00175	01920	03664	05408	07150	08889	10626	12360	14090	15816	17537	19252	20962	54
7	00204	01949	03693	05437	07179	08918	10655	12389	14119	15845	17565	19281	20990	53
8	00233	01978	03723	05466	07208	08947	10684	12418	14148	15873	17594	19309	21019	52
9	00262	02007	03752	05495	07237	08976	10713	12447	14177	15902	17623	19338	21047	51
10	00291	02036	03781	05524	07266	09005	10742	12476	14205	15931	17651	19366	21076	50
11	00320	02065	03810	05553	07295	09034	10771	12504	14234	15959	17680	19395	21104	49
12	00349	02094	03839	05582	07324	09063	10800	12533	14263	15988	17708	19423	21132	48
13	00378	02123	03868	05611	07353	09092	10829	12562	14292	16017	17737	19452	21161	47
14	00407	02152	03897	05640	07382	09121	10858	12591	14320	16046	17766	19481	21189	46
15	00436	02181	03926	05669	07411	09150	10887	12620	14349	16074	17794	19509	21218	45
16	00465	02211	03955	05698	07440	09179	10916	12649	14378	16103	17823	19538	21246	44
17	00495	02240	03984	05727	07469	09208	10945	12678	14407	16132	17852	19566	21275	43
18	00524	02269	04013	05756	07498	09237	10973	12706	14436	16160	17880	19595	21303	42
19	00553	02298	04042	05785	07527	09266	11002	12735	14464	16189	17909	19623	21331	41
20	00582	02327	04071	05814	07556	09295	11031	12764	14493	16218	17937	19652	21360	40
21	00611	02356	04100	05844	07585	09324	11060	12793	14522	16246	17966	19680	21388	39
22	00640	02385	04129	05873	07614	09353	11089	12822	14551	16275	17995	19709	21417	38
23	00669	02414	04159	05902	07643	09382	11118	12851	14580	16304	18023	19737	21445	37
24	00698	02443	04188	05931	07672	09411	11147	12880	14608	16333	18052	19766	21474	36
25	00727	02472	04217	05960	07701	09440	11176	12908	14637	16361	18081	19794	21502	35
26	00756	02501	04246	05989	07730	09469	11205	12937	14666	16390	18109	19823	21530	34
27	00785	02530	04275	06018	07759	09498	11234	12966	14695	16419	18138	19851	21559	33
28	00814	02560	04304	06047	07788	09527	11263	12995	14723	16447	18166	19880	21587	32
29	00844	02589	04333	06076	07817	09556	11291	13024	14752	16476	18195	19908	21616	31
30	00873	02618	04362	06105	07846	09585	11320	13053	14781	16505	18224	19937	21644	30
31	00902	02647	04391	06134	07875	09614	11349	13081	14810	16533	18252	19965	21672	29
32	00931	02676	04420	06163	07904	09642	11378	13110	14838	16562	18281	19994	21701	28
33	00960	02705	04449	06192	07933	09671	11407	13139	14867	16591	18309	20022	21729	27
34	00989	02734	04478	06221	07962	09700	11436	13168	14896	16620	18338	20051	21758	26
35	01018	02763	04507	06250	07991	09729	11465	13197	14925	16648	18367	20079	21786	25
36	01047	02792	04536	06279	08020	09758	11494	13226	14954	16677	18395	20108	21814	24
37	01076	02821	04565	06308	08049	09787	11523	13254	14982	16706	18424	20136	21843	23
38	01105	02850	04594	06337	08078	09816	11552	13283	15011	16734	18452	20165	21871	22
39	01134	02879	04623	06366	08107	09845	11580	13312	15040	16763	18481	20193	21899	21
40	01164	02908	04653	06395	08136	09874	11609	13341	15069	16792	18509	20222	21928	20
41	01193	02936	04682	06424	08165	09903	11638	13370	15097	16820	18538	20250	21956	19
42	01222	02967	04711	06453	08194	09932	11667	13399	15126	16849	18567	20279	21985	18
43	01251	02996	04740	06482	08223	09961	11696	13427	15155	16878	18595	20307	22013	17
44	01280	03025	04769	06511	08252	09990	11725	13456	15184	16906	18624	20336	22041	16
45	01309	03054	04798	06540	08281	10019	11754	13485	15212	16935	18652	20364	22070	15
46	01338	03083	04827	06569	08310	10048	11783	13514	15241	16964	18681	20393	22098	14
47	01367	03112	04856	06598	08339	10077	11812	13543	15270	16992	18710	20421	22126	13
48	01396	03141	04885	06627	08368	10106	11840	13572	15299	17021	18738	20450	22155	12
49	01425	03170	04914	06656	08397	10135	11869	13600	15327	17050	18767	20478	22183	11
50	01454	03199	04943	06685	08426	10164	11898	13629	15356	17078	18795	20507	22212	10
51	01483	03228	04972	06714	08455	10192	11927	13658	15385	17107	18824	20535	22240	9
52	01513	03257	05001	06743	08484	10221	11956	13687	15414	17136	18852	20563	22268	8
53	01542	03286	05030	06773	08513	10250	11985	13716	15442	17164	18881	20592	22297	7
54	01571	03316	05059	06802	08542	10279	12014	13744	15471	17193	18910	20620	22325	6
55	01600	03345	05088	06831	08571	10308	12043	13773	15500	17222	18938	20649	22353	5
56	01629	03374	05117	06860	08600	10337	12071	13802	15529	17250	18967	20677	22382	4
57	01658	03403	05146	06889	08629	10366	12100	13831	15557	17279	18995	20706	22410	3
58	01687	03432	05175	06918	08658	10395	12129	13860	15586	17308	19024	20734	22438	2
59	01716	03461	05205	06947	08687	10424	12158	13889	15615	17336	19052	20763	22467	1
60	01745	03490	05234	06976	08716	10453	12187	13917	15643	17365	19081	20791	22495	0
′	89°	88°	87°	86°	85°	84°	83°	82°	81°	80°	79°	78°	77°	′

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Senos naturaes

T. 27)

′	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	′
0	22495	24192	25882	27564	29237	30902	32557	34202	35837	37461	39073	40674	42262	60
1	22523	24220	25910	27592	29265	30929	32584	34229	35864	37488	39100	40700	42288	59
2	22552	24249	25938	27620	29293	30957	32612	34257	35891	37515	39127	40727	42315	58
3	22580	24277	25966	27648	29321	30985	32639	34284	35918	37542	39153	40753	42341	57
4	22608	24305	25994	27676	29348	31012	32667	34311	35945	37569	39180	40780	42367	56
5	22637	24333	26022	27704	29376	31040	32694	34339	35973	37595	39207	40806	42394	55
6	22665	24362	26050	27731	29404	31068	32722	34366	36000	37622	39234	40833	42420	54
7	22693	24390	26079	27759	29432	31095	32749	34393	36027	37649	39260	40860	42446	53
8	22722	24418	26107	27787	29460	31123	32777	34421	36054	37676	39287	40886	42473	52
9	22750	24446	26135	27815	29487	31151	32804	34448	36081	37703	39314	40913	42499	51
10	22778	24474	26163	27843	29515	31178	32832	34475	36108	37730	39341	40939	42525	50
11	22807	24503	26191	27871	29543	31206	32859	34503	36135	37757	39367	40966	42552	49
12	22835	24531	26219	27899	29571	31233	32887	34530	36162	37784	39394	40992	42578	48
13	22863	24559	26247	27927	29599	31261	32914	34557	36190	37811	39421	41019	42604	47
14	22892	24587	26275	27955	29626	31289	32942	34584	36217	37838	39448	41045	42631	46
15	22920	24615	26303	27983	29654	31316	32969	34612	36244	37865	39474	41072	42657	45
16	22948	24644	26331	28011	29682	31344	32997	34639	36271	37892	39501	41098	42683	44
17	22977	24672	26359	28039	29710	31372	33024	34666	36298	37919	39528	41125	42709	43
18	23005	24700	26387	28067	29737	31399	33051	34694	36325	37946	39555	41151	42736	42
19	23033	24728	26415	28095	29765	31427	33079	34721	36352	37973	39581	41178	42762	41
20	23012	24756	26443	28123	29793	31454	33106	34748	36379	37999	39608	41204	42788	40
21	23090	24784	26471	28150	29821	31482	33134	34775	36406	38026	39635	41231	42815	39
22	23118	24813	26500	28178	29849	31510	33161	34803	36434	38053	39661	41257	42841	38
23	23146	24841	26528	28206	29876	31537	33189	34830	36461	38080	39688	41284	42867	37
24	23175	24869	26556	28234	29904	31565	33216	34857	36488	38107	39715	41310	42894	36
25	23203	24897	26584	28262	29932	31593	33244	34884	36515	38134	39741	41337	42920	35
26	23231	24925	26612	28290	29960	31620	33271	34912	36542	38161	39768	41363	42946	34
27	23260	24954	26640	28318	29987	31648	33298	34939	36569	38188	39795	41390	42972	33
28	23288	24982	26668	28346	30015	31675	33326	34966	36596	38215	39822	41416	42999	32
29	23316	25010	26696	28374	30043	31703	33353	34993	36623	38241	39848	41443	43025	31
30	23345	25038	26724	28402	30071	31730	33381	35021	36650	38268	39875	41469	43051	30
31	23373	25066	26752	28429	30098	31758	33408	35048	36677	38295	39902	41496	43077	29
32	23401	25094	26780	28457	30126	31786	33436	35075	36704	38322	39928	41522	43104	28
33	23429	25122	26808	28485	30154	31813	33463	35102	36731	38349	39955	41549	43130	27
34	23458	25151	26836	28513	30182	31841	33490	35130	36758	38376	39982	41575	43156	26
35	23486	25179	26864	28541	30209	31868	33518	35157	36785	38403	40008	41602	43182	25
36	23514	25207	26892	28569	30237	31896	33545	35184	36812	38430	40035	41628	43209	24
37	23542	25235	26920	28597	30265	31923	33573	35211	36839	38456	40062	41655	43235	23
38	23571	25263	26948	28625	30292	31951	33600	35239	36867	38483	40088	41681	43261	22
39	23599	25291	26976	28652	30320	31979	33627	35266	36894	38510	40115	41707	43287	21
40	23627	25320	27004	28680	30348	32006	33655	35293	36921	38537	40141	41734	43313	20
41	23656	25348	27032	28708	30376	32034	33682	35320	36948	38564	40168	41760	43340	19
42	23684	25376	27060	28736	30403	32061	33710	35347	36975	38591	40195	41787	43366	18
43	23712	25404	27088	28764	30431	32089	33737	35375	37002	38617	40221	41813	43392	17
44	23740	25432	27116	28792	30459	32116	33764	35402	37029	38644	40248	41840	43418	16
45	23769	25460	27144	28820	30486	32144	33792	35429	37056	38671	40275	41866	43445	15
46	23797	25488	27172	28847	30514	32171	33819	35456	37083	38698	40301	41892	43471	14
47	23825	25516	27200	28875	30542	32199	33846	35484	37110	38725	40328	41919	43497	13
48	.23853	25545	27228	28903	30570	32227	33874	35511	37137	38752	40355	41945	43523	12
49	23882	25573	27256	28931	30597	32254	33901	35538	37164	38778	40381	41972	43549	11
50	23910	25601	27284	28959	30625	32282	33929	35565	37191	38805	40408	41998	43575	10
51	23938	25629	27312	28987	30653	32309	33956	35592	37218	38832	40434	42024	43602	9
52	23966	25657	27340	29015	30680	32337	33983	35619	37245	38859	40461	42051	43628	8
53	23995	25685	27368	29042	30708	32364	34011	35647	37272	38886	40488	42077	43654	7
54	24023	25713	27396	29070	30736	32392	34038	35674	37299	38912	40514	42104	43680	6
55	24051	25741	27424	29098	30763	32419	34065	35701	37326	38939	40541	42130	43706	5
56	24079	25769	27452	29126	30791	32447	34093	35728	37353	38966	40567	42156	43733	4
57	24108	25798	27480	29154	30819	32474	34120	35755	37380	38993	40594	42183	43759	3
58	24136	25826	27508	29182	30846	32502	34147	35782	37407	39020	40621	42209	43785	2
59	24164	25854	27536	29209	30874	32529	34175	35810	37434	39046	40647	42235	43811	1
60	24192	25882	27564	29237	30902	32557	34202	35837	37461	39073	40674	42262	43837	0
′	76°	75°	74°	73°	72°	71°	70°	69°	68°	67°	66°	65°	64°	′

P. p.

″ 29
10 | 5
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″ 28
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″ 27
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Cosenos naturaes

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Senos naturaes

T. 27)

′	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°	36°	37°	38°	′
0	43837	45399	46947	48481	50000	51504	52992	54464	55919	57358	58779	60182	61566	60
1	43863	45425	46973	48506	50025	51529	53017	54488	55943	57381	58802	60205	61589	59
2	43889	45451	46999	48532	50050	51554	53041	54513	55968	57405	58826	60228	61612	58
3	43916	45477	47024	48557	50076	51579	53066	54537	55992	57429	58849	60251	61635	57
4	43942	45503	47050	48583	50101	51604	53091	54561	56016	57453	58873	60274	61658	56
5	43968	45529	47076	48608	50126	51628	53115	54586	56040	57477	58896	60298	61681	55
6	43994	45554	47101	48634	50151	51653	53140	54610	56064	57501	58920	60321	61704	54
7	44020	45580	47127	48659	50176	51678	53164	54635	56088	57524	58943	60344	61726	53
8	44046	45606	47153	48684	50201	51703	53189	54659	56112	57548	58967	60367	61749	52
9	44072	45632	47178	48710	50227	51728	53214	54683	56136	57572	58990	60390	61772	51
10	44098	45658	47204	48735	50252	51753	53238	54708	56160	57596	59014	60414	61795	50
11	44124	45684	47229	48761	50277	51778	53263	54732	56184	57619	59037	60437	61818	49
12	44151	45710	47255	48786	50302	51803	53288	54756	56208	57643	59061	60460	61841	48
13	44177	45736	47281	48811	50327	51828	53312	54781	56232	57667	59084	60483	61864	47
14	44203	45762	47306	48837	50352	51852	53337	54805	56256	57691	59108	60506	61887	46
15	44229	45787	47332	48862	50377	51877	53361	54829	56280	57715	59131	60529	61909	45
16	44255	45813	47358	48888	50403	51902	53386	54854	56305	57738	59154	60553	61932	44
17	44281	45839	47383	48913	50428	51927	53411	54878	56329	57762	59178	60576	61955	43
18	44307	45865	47409	48938	50453	51952	53435	54902	56353	57786	59201	60599	61978	42
19	44333	45891	47434	48964	50478	51977	53460	54927	56377	57810	59225	60622	62001	41
20	44359	45917	47460	48989	50503	52002	53484	54951	56401	57833	59248	60645	62024	40
21	44385	45942	47486	49014	50528	52026	53509	54975	56425	57857	59272	60668	62046	39
22	44411	45968	47511	49040	50553	52051	53534	54999	56449	57881	59295	60691	62069	38
23	44437	45994	47537	49065	50578	52076	53558	55024	56473	57904	59318	60714	62092	37
24	44464	46020	47562	49090	50603	52101	53583	55048	56497	57928	59342	60738	62115	36
25	44490	46046	47588	49116	50628	52126	53607	55072	56521	57952	59365	60761	62138	35
26	44516	46072	47614	49141	50654	52151	53632	55097	56545	57976	59389	60784	62160	34
27	44542	46097	47639	49166	50679	52175	53656	55121	56569	57999	59412	60807	62183	33
28	44568	46123	47665	49192	50704	52200	53681	55145	56593	58023	59436	60830	62206	32
29	44594	46149	47690	49217	50729	52225	53705	55169	56617	58047	59459	60853	62229	31
30	44620	46175	47716	49242	50754	52250	53730	55194	56641	58070	59482	60876	62251	30
31	44646	46201	47741	49268	50779	52275	53754	55218	56665	58094	59506	60899	62274	29
32	44672	46226	47767	49293	50804	52299	53779	55242	56689	58118	59529	60922	62297	28
33	44698	46252	47793	49318	50829	52324	53804	55266	56713	58141	59552	60945	62320	27
34	44724	46278	47818	49344	50854	52349	53828	55291	56736	58165	59576	60968	62342	26
35	44750	46304	47844	49369	50879	52374	53853	55315	56760	58189	59599	60991	62365	25
36	44776	46330	47869	49394	50904	52399	53877	55339	56784	58212	59622	61015	62388	24
37	44802	46355	47895	49419	50929	52423	53902	55363	56808	58236	59646	61038	62411	23
38	44828	46381	47920	49445	50954	52448	53926	55388	56832	58260	59669	61061	62433	22
39	44854	46407	47946	49470	50979	52473	53951	55412	56856	58283	59693	61084	62456	21
40	44880	46433	47971	49495	51004	52498	53975	55436	56880	58307	59716	61107	62479	20
41	44906	46458	47997	49521	51029	52522	54000	55460	56904	58330	59739	61130	62502	19
42	44932	46484	48022	49546	51054	52547	54024	55484	56928	58354	59763	61153	62524	18
43	44958	46510	48048	49571	51079	52572	54049	55509	56952	58378	59786	61176	62547	17
44	44984	46536	48073	49596	51104	52597	54073	55533	56976	58401	59809	61199	62570	16
45	45010	46561	48099	49622	51129	52621	54097	55557	57000	58425	59832	61222	62592	15
46	45036	46587	48124	49647	51154	52646	54122	55581	57024	58449	59856	61245	62615	14
47	45062	46613	48150	49672	51179	52671	54146	55605	57047	58472	59879	61268	62638	13
48	45088	46639	48175	49697	51201	52696	54171	55630	57071	58496	59902	61291	62660	12
49	45114	46664	48201	49723	51229	52720	54195	55654	57095	58519	59926	61314	62683	11
50	45140	46690	48226	49748	51254	52745	54220	55678	57119	58543	59949	61337	62706	10
51	45166	46716	48252	49773	51279	52770	54244	55702	57143	58567	59972	61360	62728	9
52	45192	46742	48277	49798	51304	52794	54269	55726	57167	58590	59995	61383	62751	8
53	45218	46767	48303	49824	51329	52819	54293	55750	57191	58614	60019	61406	62774	7
54	45243	46793	48328	49849	51354	52844	54317	55775	57215	58637	60042	61429	62796	6
55	45269	46819	48354	49874	51379	52869	54342	55799	57238	58661	60065	61451	62819	5
56	45295	46844	48379	49899	51404	52893	54366	55823	57262	58684	60089	61474	62842	4
57	45321	46870	48405	49924	51429	52918	54391	55847	57286	58708	60112	61497	62864	3
58	45347	46896	48430	49950	51454	52943	54415	55871	57310	58731	60135	61520	62887	2
59	45373	46921	48456	49975	51479	52967	54440	55895	57334	58755	60158	61543	62909	1
60	45399	46947	48481	50000	51504	52992	54464	55919	57358	58779	60182	61566	62932	0
′	63°	62°	61°	60°	59°	58°	57°	56°	55°	54°	53°	52°	51°	′

P. p.

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Cosenos naturaes

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Senos naturaes

T. 27)

′	39°	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	51°	′
0	62932	64279	65606	66913	68200	69466	70711	71934	73135	74314	75471	76604	77715	60
1	62955	64301	65628	66935	68221	69487	70731	71954	73155	74334	75490	76623	77733	59
2	62977	64323	65650	66956	68242	69508	70752	71974	73175	74353	75509	76642	77751	58
3	63000	64346	65672	66978	68264	69529	70772	71995	73195	74373	75528	76661	77769	57
4	63022	64368	65694	66999	68285	69549	70793	72015	73215	74392	75547	76679	77788	56
5	63045	64390	65716	67021	68306	69570	70813	72035	73234	74412	75566	76698	77806	55
6	63068	64412	65738	67043	68327	69591	70834	72055	73254	74431	75585	76717	77824	54
7	63090	64435	65759	67064	68349	69612	70855	72075	73274	74451	75604	76735	77843	53
8	63113	64457	65781	67086	68370	69633	70875	72095	73294	74470	75623	76754	77861	52
9	63135	64479	65803	67107	68391	69654	70896	72116	73314	74489	75642	76772	77879	51
10	63158	64501	65825	67129	68412	69675	70916	72136	73333	74509	75661	76791	77897	50
11	63180	64524	65847	67151	68434	69696	70937	72156	73353	74528	75680	76810	77916	49
12	63203	64546	65869	67172	68455	69717	70957	72176	73373	74548	75700	76828	77934	48
13	63225	64568	65891	67194	68476	69737	70978	72196	73393	74567	75719	76847	77952	47
14	63248	64590	65913	67215	68497	69758	70998	72216	73413	74586	75738	76866	77970	46
15	63271	64612	65935	67237	68518	69779	71019	72236	73432	74606	75756	76884	77988	45
16	63293	64635	65956	67258	68539	69800	71039	72257	73452	74625	75775	76903	78007	44
17	63316	64657	65978	67280	68561	69821	71059	72277	73472	74644	75794	76921	78025	43
18	63338	64679	66000	67301	68582	69842	71080	72297	73491	74664	75813	76940	78043	42
19	63361	64701	66022	67323	68603	69862	71100	72317	73511	74683	75832	76959	78061	41
20	63383	64723	66044	67344	68624	69883	71121	72337	73531	74703	75851	76977	78079	40
21	63406	64746	66066	67366	68645	69904	71141	72357	73551	74722	75870	76996	78098	39
22	63428	64768	66088	67387	68666	69925	71162	72377	73570	74741	75889	77014	78116	38
23	63451	64790	66109	67409	68688	69946	71182	72397	73590	74760	75908	77033	78134	37
24	63473	64812	66131	67430	68709	69966	71203	72417	73610	74780	75927	77051	78152	36
25	63496	64834	66153	67452	68730	69987	71223	72437	73629	74799	75946	77070	78170	35
26	63518	64856	66175	67473	68751	70008	71243	72457	73649	74818	75965	77088	78188	34
27	63540	64878	66197	67495	68772	70029	71264	72477	73669	74838	75984	77107	78206	33
28	63563	64901	66218	67516	68793	70049	71284	72497	73688	74857	76003	77125	78225	32
29	63585	64923	66240	67538	68814	70070	71305	72517	73708	74876	76022	77144	78243	31
30	63608	64945	66262	67559	68835	70091	71325	72537	73728	74896	76041	77162	78261	30
31	63630	64967	66284	67580	68857	70112	71345	72557	73747	74915	76059	77181	78279	29
32	63653	64989	66306	67602	68878	70132	71366	72577	73767	74934	76078	77199	78297	28
33	63675	65011	66327	67623	68899	70153	71386	72597	73787	74953	76097	77218	78315	27
34	63698	65033	66349	67645	68920	70174	71407	72617	73806	74973	76116	77236	78333	26
35	63720	65055	66371	67666	68941	70195	71427	72637	73826	74992	76135	77255	78351	25
36	63742	65077	66393	67688	68962	70215	71447	72657	73846	75011	76154	77273	78369	24
37	63765	65100	66414	67709	68983	70236	71468	72677	73865	75030	76173	77292	78387	23
38	63787	65122	66436	67730	69004	70257	71488	72697	73885	75050	76192	77310	78405	22
39	63810	65144	66458	67752	69025	70277	71508	72717	73904	75069	76210	77329	78424	21
40	63832	65166	66480	67773	69046	70298	71529	72737	73924	75088	76229	77347	78442	20
41	63854	65188	66501	67795	69067	70319	71549	72757	73944	75107	76248	77366	78460	19
42	63877	65210	66523	67816	69088	70339	71569	72777	73963	75126	76267	77384	78478	18
43	63899	65232	66545	67837	69109	70360	71590	72797	73983	75146	76286	77402	78496	17
44	63922	65254	66566	67859	69130	70381	71610	72817	74002	75165	76304	77421	78514	16
45	63944	65276	66588	67880	69151	70401	71630	72837	74022	75184	76323	77439	78532	15
46	63966	65298	66610	67901	69172	70422	71650	72857	74041	75203	76342	77458	78550	14
47	63989	65320	66632	67923	69193	70443	71671	72877	74061	75222	76361	77476	78568	13
48	64011	65342	66653	67944	69214	70463	71691	72897	74080	75241	76380	77494	78586	12
49	64033	65364	66675	67965	69235	70484	71711	72917	74100	75261	76398	77513	78604	11
50	64056	65386	66697	67987	69256	70505	71732	72937	74120	75280	76417	77531	78622	10
51	64078	65408	66718	68008	69277	70525	71752	72957	74139	75299	76436	77550	78640	9
52	64100	65430	66740	68029	69298	70546	71772	72976	74159	75318	76455	77568	78658	8
53	64123	65452	66762	68051	69319	70567	71792	72996	74178	75337	76473	77586	78676	7
54	64145	65474	66783	68072	69340	70587	71813	73016	74198	75356	76492	77605	78694	6
55	64167	65496	66805	68093	69361	70608	71833	73036	74217	75375	76511	77623	78711	5
56	64190	65518	66827	68115	69382	70628	71853	73056	74237	75395	76530	77641	78729	4
57	64212	65540	66848	68136	69403	70649	71873	73076	74256	75414	76548	77660	78747	3
58	64234	65562	66870	68157	69424	70670	71894	73096	74276	75433	76567	77678	78765	2
59	64256	65584	66891	68179	69445	70690	71914	73116	74295	75452	76586	77696	78783	1
60	64279	65606	66913	68200	69466	70711	71934	73135	74314	75471	76604	77715	78801	0
′	50°	49°	48°	47°	46°	45°	44°	43°	42°	41°	40°	39°	38°	′

P. p.

″	23	22
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Cosenos naturaes

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Senos naturaes

T. 27)

′	52°	53°	54°	55°	56°	57°	58°	59°	60°	61°	62°	63°	64°	′
0	78801	79864	80902	81915	82904	83867	84805	85717	86603	87462	88295	89101	89879	60
1	78819	79881	80919	81932	82920	83883	84820	85732	86617	87476	88308	89114	89892	59
2	78837	79899	80936	81949	82936	83899	84836	85747	86632	87490	88322	89127	89905	58
3	78855	79916	80953	81965	82953	83915	84851	85762	86646	87504	88336	89140	89918	57
4	78873	79934	80970	81982	82969	83930	84866	85777	86661	87518	88349	89153	89930	56
5	78891	79951	80987	81999	82985	83946	84882	85792	86675	87532	88363	89167	89943	55
6	78908	79968	81004	82015	83001	83962	84897	85806	86690	87546	88377	89180	89956	54
7	78926	79986	81021	82032	83017	83978	84913	85821	86704	87561	88390	89193	89968	53
8	78944	80003	81038	82048	83034	83994	84928	85836	86719	87575	88404	89206	89981	52
9	78962	80021	81055	82065	83050	84009	84943	85851	86733	87589	88417	89219	89994	51
10	78980	80038	81072	82082	83066	84025	84959	85866	86748	87603	88431	89232	90007	50
11	78998	80056	81089	82098	83082	84041	84974	85881	86762	87617	88445	89245	90019	49
12	79016	80073	81106	82115	83098	84057	84989	85896	86777	87631	88458	89259	90032	48
13	79033	80091	81123	82132	83115	84072	85005	85911	86791	87645	88472	89272	90045	47
14	79051	80108	81140	82148	83131	84088	85020	85926	86805	87659	88485	89285	90057	46
15	79069	80125	81157	82165	83147	84104	85035	85941	86820	87673	88499	89298	90070	45
16	79087	80143	81174	82181	83163	84120	85051	85956	86834	87687	88512	89311	90082	44
17	79105	80160	81191	82198	83179	84135	85066	85970	86849	87701	88526	89324	90095	43
18	79122	80178	81208	82214	83195	84151	85081	85985	86863	87715	88539	89337	90108	42
19	79140	80195	81225	82231	83212	84167	85096	86000	86878	87729	88553	89350	90120	41
20	79158	80212	81242	82248	83228	84182	85112	86015	86892	87743	88566	89363	90133	40
21	79176	80230	81259	82264	83244	84198	85127	86030	86906	87756	88580	89376	90146	39
22	79193	80247	81276	82281	83260	84214	85142	86045	86921	87770	88593	89389	90158	38
23	79211	80264	81293	82297	83276	84230	85157	86059	86935	87784	88607	89402	90171	37
24	79229	80282	81310	82314	83292	84245	85173	86074	86949	87798	88620	89415	90183	36
25	79247	80299	81327	82330	83308	84261	85188	86089	86964	87812	88634	89428	90196	35
26	79264	80316	81344	82347	83324	84277	85203	86104	86978	87826	88647	89441	90208	34
27	79282	80334	81361	82363	83340	84292	85218	86119	86993	87840	88661	89454	90221	33
28	79300	80351	81378	82380	83356	84308	85234	86133	87007	87854	88674	89467	90233	32
29	79318	80368	81395	82396	83373	84324	85249	86148	87021	87868	88688	89480	90246	31
30	79335	80386	81412	82413	83389	84339	85264	86163	87036	87882	88701	89493	90259	30
31	79353	80403	81428	82429	83405	84355	85279	86178	87050	87896	88715	89506	90271	29
32	79371	80420	81445	82446	83421	84370	85294	86192	87064	87909	88728	89519	90284	28
33	79388	80438	81462	82462	83437	84386	85310	86207	87079	87923	88741	89532	90296	27
34	79406	80455	81479	82478	83453	84402	85325	86222	87093	87937	88755	89545	90309	26
35	79424	80472	81496	82495	83469	84417	85340	86237	87107	87951	88768	89558	90321	25
36	79441	80489	81513	82511	83485	84433	85355	86251	87121	87965	88782	89571	90334	24
37	79459	80507	81530	82528	83501	84448	85370	86266	87136	87979	88795	89584	90346	23
38	79477	80524	81546	82544	83517	84464	85385	86281	87150	87993	88808	89597	90358	22
39	79494	80541	81563	82561	83533	84480	85401	86295	87164	88006	88822	89610	90371	21
40	79512	80558	81580	82577	83549	84495	85416	86310	87178	88020	88835	89623	90383	20
41	79530	80576	81597	82593	83565	84511	85431	86325	87193	88034	88848	89636	90396	19
42	79547	80593	81614	82610	83581	84526	85446	86340	87207	88048	88862	89649	90408	18
43	79565	80610	81631	82626	83597	84542	85461	86354	87221	88062	88875	89662	90421	17
44	79583	80627	81647	82643	83613	84557	85476	86369	87235	88075	88888	89674	90433	16
45	79600	80644	81664	82659	83629	84573	85491	86384	87250	88089	88902	89687	90446	15
46	79618	80662	81681	82675	83645	84588	85506	86398	87264	88103	88915	89700	90458	14
47	79635	80679	81698	82692	83660	84604	85521	86413	87278	88117	88928	89713	90470	13
48	79653	80696	81714	82708	83676	84619	85536	86427	87292	88130	88942	89726	90483	12
49	79671	80713	81731	82724	83692	84635	85551	86442	87306	88144	88955	89739	90495	11
50	79688	80730	81748	82741	83708	84650	85567	86457	87321	88158	88968	89752	90507	10
51	79706	80748	81765	82757	83724	84666	85582	86471	87335	88172	88981	89764	90520	9
52	79723	80765	81782	82773	83740	84681	85597	86486	87349	88185	88995	89777	90532	8
53	79741	80782	81798	82790	83756	84697	85612	86501	87363	88199	89008	89790	90545	7
54	79758	80799	81815	82806	83772	84712	85627	86515	87377	88213	89021	89803	90557	6
55	79776	80816	81832	82822	83788	84728	85642	86530	87391	88226	89035	89816	90569	5
56	79793	80833	81848	82839	83804	84743	85657	86544	87406	88240	89048	89828	90582	4
57	79811	80850	81865	82855	83819	84759	85672	86559	87420	88254	89061	89841	90594	3
58	79829	80867	81882	82871	83835	84774	85687	86573	87434	88267	89074	89854	90606	2
59	79846	80885	81899	82887	83851	84789	85702	86588	87448	88281	89087	89867	90618	1
60	79864	80902	81915	82904	83867	84805	85717	86603	87462	88295	89101	89879	90631	0
′	37°	36°	35°	34°	33°	32°	31°	30°	29°	28°	27°	26°	25°	′

P. p.

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T. 27)

′	65°	66°	67°	68°	69°	70°	71°	72°	73°	74°	75°	76°	77°	′
0	90631	91355	92050	92718	93358	93969	94552	95106	95630	96126	96593	97030	97437	60
1	90643	91366	92062	92729	93368	93979	94561	95115	95639	96134	96600	97037	97444	59
2	90655	91378	92073	92740	93379	93989	94571	95124	95647	96142	96608	97044	97450	58
3	90668	91390	92085	92751	93389	93999	94580	95133	95656	96150	96615	97051	97457	57
4	90680	91402	92096	92762	93400	94009	94590	95142	95664	96158	96623	97058	97463	56
5	90692	91414	92107	92773	93410	94019	94599	95150	95673	96166	96630	97065	97470	55
6	90704	91425	92119	92784	93420	94029	94609	95159	95681	96174	96638	97072	97476	54
7	90717	91437	92130	92794	93431	94039	94618	95168	95690	96182	96645	97079	97483	53
8	90729	91449	92141	92805	93441	94049	94627	95177	95698	96190	96653	97086	97489	52
9	90741	91461	92152	92816	93452	94058	94637	95186	95707	96198	96660	97093	97496	51
10	90753	91472	92164	92827	93462	94068	94646	95195	95715	96206	96667	97100	97502	50
11	90766	91484	92175	92838	93472	94078	94656	95204	95724	96214	96675	97106	97508	49
12	90778	91496	92186	92849	93483	94088	94665	95213	95732	96222	96682	97113	97515	48
13	90790	91508	92198	92859	93493	94098	94674	95222	95740	96230	96690	97120	97521	47
14	90802	91519	92209	92870	93503	94108	94684	95231	95749	96238	96697	97127	97528	46
15	90814	91531	92220	92881	93514	94118	94693	95240	95757	96246	96705	97134	97534	45
16	90826	91543	92231	92892	93524	94127	94702	95248	95766	96253	96712	97141	97541	44
17	90839	91555	92243	92902	93534	94137	94712	95257	95774	96261	96719	97148	97547	43
18	90851	91566	92254	92913	93544	94147	94721	95266	95782	96269	96727	97155	97553	42
19	90863	91578	92265	92924	93555	94157	94730	95275	95791	96277	96734	97162	97560	41
20	90875	91590	92276	92935	93565	94167	94740	95284	95799	96285	96742	97169	97566	40
21	90887	91601	92287	92945	93575	94176	94749	95293	95807	96293	96749	97176	97573	39
22	90899	91613	92299	92956	93585	94186	94758	95301	95816	96301	96756	97182	97579	38
23	90911	91625	92310	92967	93596	94196	94768	95310	95824	96308	96764	97189	97585	37
24	90924	91636	92321	92978	93606	94206	94777	95319	95832	96316	96771	97196	97592	36
25	90936	91648	92332	92988	93616	94215	94786	95328	95841	96324	96778	97203	97598	35
26	90948	91660	92343	92999	93626	94225	94795	95337	95849	96332	96786	97210	97604	34
27	90960	91671	92355	93010	93637	94235	94805	95345	95857	96340	96793	97217	97611	33
28	90972	91683	92366	93020	93647	94245	94814	95354	95865	96347	96800	97223	97617	32
29	90984	91694	92377	93031	93657	94254	94823	95363	95874	96355	96807	97230	97623	31
30	90996	91706	92388	93042	93667	94264	94832	95372	95882	96363	96815	97237	97630	30
31	91008	91718	92399	93052	93677	94274	94842	95380	95890	96371	96822	97244	97636	29
32	91020	91729	92410	93063	93688	94284	94851	95389	95898	96379	96829	97251	97642	28
33	91032	91741	92421	93074	93698	94293	94860	95398	95907	96386	96837	97257	97648	27
34	91044	91752	92432	93084	93708	94303	94869	95407	95915	96394	96844	97264	97655	26
35	91056	91764	92444	93095	93718	94313	94878	95415	95923	96402	96851	97271	97661	25
36	91068	91775	92455	93106	93728	94322	94888	95424	95931	96410	96858	97278	97667	24
37	91080	91787	92466	93116	93738	94332	94897	95433	95940	96417	96866	97284	97673	23
38	91092	91799	92477	93127	93748	94342	94906	95441	95948	96425	96873	97291	97680	22
39	91104	91810	92488	93137	93759	94351	94915	95450	95956	96433	96880	97298	97686	21
40	91116	91822	92499	93148	93769	94361	94924	95459	95964	96440	96887	97304	97692	20
41	91128	91833	92510	93159	93779	94370	94933	95467	95972	96448	96894	97311	97698	19
42	91140	91845	92521	93169	93789	94380	94943	95476	95981	96456	96902	97318	97705	18
43	91152	91856	92532	93180	93799	94390	94952	95485	95989	96463	96909	97325	97711	17
44	91164	91868	92543	93190	93809	94399	94961	95493	95997	96471	96916	97331	97717	16
45	91176	91879	92554	93201	93819	94409	94970	95502	96005	96479	96923	97338	97723	15
46	91188	91891	92565	93211	93829	94418	94979	95511	96013	96486	96930	97345	97729	14
47	91200	91902	92576	93222	93839	94428	94988	95519	96021	96494	96937	97351	97735	13
48	91212	91914	92587	93232	93849	94438	94997	95528	96029	96502	96945	97358	97742	12
49	91224	91925	92598	93243	93859	94447	95006	95536	96037	96509	96952	97365	97748	11
50	91236	91936	92609	93253	93869	94457	95015	95545	96046	96517	96959	97371	97754	10
51	91248	91948	92620	93264	93879	94466	95024	95554	96054	96524	96966	97378	97760	9
52	91260	91959	92631	93274	93889	94476	95033	95562	96062	96532	96973	97384	97766	8
53	91272	91971	92642	93285	93899	94485	95043	95571	96070	96540	96980	97391	97772	7
54	91283	91982	92653	93295	93909	94495	95052	95579	96078	96547	96987	97398	97778	6
55	91295	91994	92664	93306	93919	94504	95061	95588	96086	96555	96994	97404	97784	5
56	91307	92005	92675	93316	93929	94514	95070	95596	96094	96562	97001	97411	97791	4
57	91319	92016	92686	93327	93939	94523	95079	95605	96102	96570	97008	97417	97797	3
58	91331	92028	92697	93337	93949	94533	95088	95613	96110	96578	97015	97424	97803	2
59	91343	92039	92707	93348	93959	94542	95097	95622	96118	96585	97023	97430	97809	1
60	91355	92050	92718	93358	93969	94552	95106	95630	96126	96593	97030	97437	97815	0
′	24°	23°	22°	21°	20°	19°	18°	17°	16°	15°	14°	13°	12°	′

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T. 27)

′	78°	79°	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°	′
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1	97821	98168	98486	98773	99031	99258	99455	99622	99758	99864	99940	99985	59
2	97827	98174	98491	98778	99035	99262	99458	99625	99760	99866	99941	99986	58
3	97833	98179	98496	98782	99039	99265	99461	99627	99762	99867	99942	99986	57
4	97839	98185	98501	98787	99043	99269	99464	99630	99764	99869	99943	99987	56
5	97845	98190	98506	98791	99047	99272	99467	99632	99766	99870	99944	99987	55
6	97851	98196	98511	98796	99051	99276	99470	99635	99768	99872	99945	99988	54
7	97857	98201	98516	98800	99055	99279	99473	99637	99770	99873	99946	99988	53
8	97863	98207	98521	98805	99059	99283	99476	99639	99772	99875	99947	99989	52
9	97869	98212	98526	98809	99063	99286	99479	99642	99774	99876	99948	99989	51
10	97875	98218	98531	98814	99067	99290	99482	99644	99776	99878	99949	99989	50
11	97881	98223	98536	98818	99071	99293	99485	99647	99778	99879	99950	99990	49
12	97887	98229	98541	98823	99075	99297	99488	99649	99780	99881	99951	99990	48
13	97893	98234	98546	98827	99079	99300	99491	99652	99782	99882	99952	99991	47
14	97899	98240	98551	98832	99083	99303	99494	99654	99784	99883	99952	99991	46
15	97905	98245	98556	98836	99087	99307	99497	99657	99786	99885	99953	99991	45
16	97910	98250	98561	98841	99091	99310	99500	99659	99788	99886	99954	99992	44
17	97916	98256	98565	98845	99094	99314	99503	99661	99790	99888	99955	99992	43
18	97922	98261	98570	98849	99098	99317	99506	99664	99792	99889	99956	99993	42
19	97928	98267	98575	98854	99102	99320	99508	99666	99793	99890	99957	99993	41
20	97934	98272	98580	98858	99106	99324	99511	99668	99795	99892	99958	99993	40
21	97940	98277	98585	98863	99110	99327	99514	99671	99797	99893	99959	99994	39
22	97946	98283	98590	98867	99114	99331	99517	99673	99799	99894	99959	99994	38
23	97952	98288	98595	98871	99118	99334	99520	99676	99801	99896	99960	99994	37
24	97958	98294	98600	98876	99122	99337	99523	99678	99803	99897	99961	99995	36
25	97963	98299	98604	98880	99125	99341	99526	99680	99804	99898	99962	99995	35
26	97969	98304	98609	98884	99129	99344	99528	99683	99806	99900	99963	99995	34
27	97975	98310	98614	98889	99133	99347	99531	99685	99808	99901	99963	99995	33
28	97981	98315	98619	98893	99137	99351	99534	99687	99810	99902	99964	99996	32
29	97987	98320	98624	98897	99141	99354	99537	99689	99812	99904	99965	99996	31
30	97992	98325	98629	98902	99144	99357	99540	99692	99813	99905	99966	99996	30
31	97998	98331	98633	98906	99148	99360	99542	99694	99815	99906	99966	99996	29
32	98004	98336	98638	98910	99152	99364	99545	99696	99817	99907	99967	99997	28
33	98010	98341	98643	98914	99156	99367	99548	99699	99819	99909	99968	99997	27
34	98016	98347	98648	98919	99160	99370	99551	99701	99821	99910	99969	99997	26
35	98021	98352	98652	98923	99163	99374	99553	99703	99822	99911	99969	99997	25
36	98027	98357	98657	98927	99167	99377	99556	99705	99824	99912	99970	99998	24
37	98033	98362	98662	98931	99171	99380	99559	99708	99826	99913	99971	99998	23
38	98039	98368	98667	98936	99175	99383	99562	99710	99827	99915	99972	99998	22
39	98044	98373	98671	98940	99178	99386	99564	99712	99829	99916	99972	99998	21
40	98050	98378	98676	98944	99182	99390	99567	99714	99831	99917	99973	99998	20
41	98056	98383	98681	98948	99186	99393	99570	99716	99833	99918	99974	99998	19
42	98061	98389	98686	98953	99189	99396	99572	99719	99834	99919	99974	99999	18
43	98067	98394	98690	98957	99193	99399	99575	99721	99836	99921	99975	99999	17
44	98073	98399	98695	98961	99197	99402	99578	99723	99838	99922	99976	99999	16
45	98079	98404	98700	98965	99200	99406	99580	99725	99839	99923	99976	99999	15
46	98084	98409	98704	98969	99204	99409	99583	99727	99841	99924	99977	99999	14
47	98090	98414	98709	98973	99208	99412	99586	99729	99842	99925	99977	99999	13
48	98096	98420	98714	98978	99211	99415	99588	99731	99844	99926	99978	99999	12
49	98101	98425	98718	98982	99215	99418	99591	99734	99846	99927	99979	99999	11
50	98107	98430	98723	98986	99219	99421	99594	99736	99847	99929	99979	1.00000	10
51	98112	98435	98728	98990	99222	99424	99596	99738	99849	99930	99980	1.00000	9
52	98118	98440	98732	98994	99226	99428	99599	99740	99851	99931	99980	1.00000	8
53	98124	98445	98737	98998	99230	99431	99602	99742	99852	99932	99981	1.00000	7
54	98129	98450	98741	99002	99233	99434	99604	99744	99854	99933	99982	1.00000	6
55	98135	98455	98746	99006	99237	99437	99607	99746	99855	99934	99982	1.00000	5
56	98140	98461	98751	99011	99240	99440	99609	99748	99857	99935	99983	1.00000	4
57	98146	98466	98755	99015	99244	99443	99612	99750	99858	99936	99983	1.00000	3
58	98152	98471	98760	99019	99248	99446	99614	99752	99860	99937	99984	1.00000	2
59	98157	98476	98764	99025	99251	99449	99617	99754	99861	99938	99984	1.00000	1
60	98163	98481	98769	99027	99255	99452	99619	99756	99863	99939	99985	1.00000	0
′	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	′

P. p.

″	6
10	1
20	2
30	3
40	4
50	5
6	1
7	1
8	1
9	1
″	5
10	1
20	2
30	3
40	3
50	4
6	1
7	1
8	1
9	1
″	4
10	1
20	1
30	2
40	3
50	3
6	0
7	0
8	1
9	1

Cosenos naturaes

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T. 28) Conversão de medidas lineares inglezas em medidas metricas

Poligs. (inches)	m.	cm.	mm.	Pés (Feet)	Jardas	Metros	Pés (Feet)	Jardas	Metros	Pés (Feet)	Jardas	Metros
1/32	0	0	0,79	1		0,3048	43		13,1061	85		25,9075
2/32	0	0	1,58	2		0,6096	44		13,4109	86		26,2123
3/32	0	0	2,38	3	1	0,9144	45	15	13,7157	87	29	26,5171
4/32 = 1/8	0	0	3,17	4		1,2192	46		14,0204	88		26,8219
5/32	0	0	3,96	5		1,5240	47		14,3252	89		27,1267
6/32	0	0	4,75	6	2	1,8288	48	16	14,6300	90	30	27,4315
7/32	0	0	5,55	7		2,1336	49		14,9348	91		27,7363
8/32 = 1/4	0	0	6,34	8		2,4384	50		15,2397	92		28,0410
9/32	0	0	7,13	9	3	2,7431	51	17	15,5445	93	31	28,3458
10/32	0	0	7,93	10		3,0479	52		15,8493	94		28,6506
11/32	0	0	8,72	11		3,3527	53		16,1541	95		28,9554
12/32 = 3/8	0	0	9,51	12	4	3,6575	54	18	16,4589	96	32	29,2602
13/32	0	1	0,30	13		3,9623	55		16,7637	97		29,5650
14/32	0	1	1,10	14		4,2671	56		17,0684	98		29,8698
15/32	0	1	1,89	15	5	4,5719	57	19	17,3732	99	33	30,1746
16/32 = 1/2	0	1	2,68	16		4,8767	58		17,6780	100		30,4794
17/32	0	1	3,47	17		5,1815	59		17,9828	101		30,7842
18/32	0	1	4,27	18	6	5,4863	60	20	18,2876	102	34	31,0890
19/32	0	1	5,06	19		5,7911	61		18,5924	103		31,3938
20/32 = 5/8	0	1	5,85	20		6,0959	62		18,8972	104		31,6986
21/32	0	1	6,65	21	7	6,4007	63	21	19,2020	105	35	32,0034
22/32	0	1	7,44	22		6,7055	64		19,5068	106		32,3082
23/32	0	1	8,23	23		7,0103	65		19,8116	107		32,6130
24/32 = 3/4	0	1	9,03	24	8	7,3151	66	22	20,1163	108	36	32,9178
25/32	0	1	9,82	25		7,6199	67		20,4211	109		33,2225
26/32	0	2	0,61	26		7,9246	68		20,7259	110		33,5273
27/32	0	2	1,41	27	9	8,2294	69	23	21,0307	111	37	33,8321
28/32 = 7/8	0	2	2,20	28		8,5342	70		21,3356	112		34,1369
29/32	0	2	2,99	29		8,8390	71		21,6404	113		34,4417
30/32	0	2	3,79	30	10	9,1438	72	24	21,9452	114	38	34,7465
31/32	0	2	4,58	31		9,4486	73		22,2500	115		35,0513
32/32 = 1	0	2	5,399	32		9,7534	74		22,5548	116		35,3561
2	0	5	0,798	33	11	10.0582	75	25	22,8596	117	39	35,6609
3	0	7	6,197	34		10.3630	76		23,1643	118		35,9657
4	0	10	1,596	35		10,6678	77		23,4691	119		36,2705
5	0	12	6,995	36	12	10,9726	78	26	23,7739	120	40	36,5753
6	0	15	2,394	37		11,2774	79		24,0787	150	50	45,7195
7	0	17	7,793	38		11,5821	80		24,3835	180	60	54,8629
8	0	20	3,192	39	13	11,8869	81	27	24,6883	210	70	64,0067
9	0	22	8,591	40		12,1917	82		24,9931	240	80	73,1506
10	0	25	3,990	41		12,4965	83		25,2979	270	90	82,2944
11	0	27	9,389	42	14	12,8013	84	28	25,6027	300	100	91,4382

1 Braça (Fathom) = 6 pés (Feet) = 2 jardas (Yards) = 1.83m
1 Milha (Nautical mile) = 6080 pés (Feet) = 1853.1m

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Conversão de medidas metricas em medidas inglezas

T. 28-a)

cm.	Pollgs. (inches)	cm.	Pollgs. (inches)	cm.	Pollgs. (inches)
1	0.3937	45	17,717	89	35,040
2	0,7874	46	18,111	90	35,434
3	1,1811	47	18,504	91	35,827
4	1,5748	48	18,898	92	36,221
5	1,9685	49	19,292	93	36,615
6	2,3622	50	19,685	94	37,009
7	2,7559	51	20,079	95	37,402
8	3,1497	52	20,473	96	37,796
9	3,5434	53	20,867	97	38,190
10	3,9371	54	21,260	98	38,583
11	4,3308	55	21,654	99	38,977
12	4,7245	56	22,048		
13	5,1182	57	22,441		
14	5,5119	58	22,835		
15	5,9056	59	23,229		
16	6,2993	60	23,622		
17	6,6930	61	24,016		
18	7,0867	62	24,410		
19	7,4805	63	24,804		
20	7,8742	64	25,197		
21	8,2679	65	25,591		
22	8,6616	66	25,985		
23	9,0553	67	26,378		
24	9,4490	68	26,772		
25	9,8427	69	27,166		
26	10,236	70	27,560		
27	10,630	71	27,953		
28	11,024	72	28,347		
29	11,418	73	28,741		
30	11,811	74	29,134		
31	12,205	75	29,528		
32	12,599	76	29,922		
33	12,992	77	30,316		
34	13,386	78	30,709		
35	13,780	79	31,103		
36	14,173	80	31,497		
37	14,567	81	31,890		
38	14,961	82	32,284		
39	15,355	83	32,678		
40	15,748	84	33,071		
41	16,142	85	33,465		
42	16,536	86	33,859		
43	16,929	87	34,253		
44	17,323	88	34,646		

m.	Pés (Feet)
1	3,2809
2	6,5618
3	9,8427
4	13,124
5	16,404
6	19,685
7	22,966
8	26,247
9	29,528
10	32,809
11	36,090
12	39,371
13	42,652
14	45,933
15	49,213
16	52,494
17	55,775
18	59,056
19	62,337
20	65,618
21	68,889
22	72,180
23	75,461
24	78,742
25	82,022
26	85,303
27	88,584

m.	Pés (Feet)	m.	Pés (Feet)	m.	Pés (Feet)
28	91,865	72	236,22	180	590,56
29	95,146	73	239,51	185	606,97
30	98,427	74	242,79	190	623,37
31	101,71	75	246,07	195	639,78
32	104,99	76	249,35	200	656,18
33	108,27	77	252,63	210	688,99
34	111,55	78	255,91	220	721,80
35	114,83	79	259,19	230	754,61
36	118,11	80	262,47	240	787,42
37	121,39	81	265,75	250	820,22
38	124,67	82	269,03	260	853,03
39	127,96	83	272,31	270	885,84
40	131,24	84	275,60	280	918,65
41	134,52	85	278,88	290	951,46
42	137,80	86	282,16	300	984,27
43	141,08	87	285,44	310	1017,1
44	144,36	88	288,72	320	1049,9
45	147,64	89	292,00	330	1082,7
46	150,92	90	295,28	340	1115,5
47	154,20	91	298,56	350	1148,3
48	157,48	92	301,84	360	1181,1
49	160,76	93	305,12	370	1213,9
50	164,04	94	308,40	380	1246,7
51	167,32	95	311,69	390	1279,6
52	170,61	96	314,97	400	1312,4
53	173,89	97	318,25	410	1345,2
54	177,17	98	321,53	420	1378,0
55	180,45	99	324,81	430	1410,8
56	183,73	100	328,09	440	1443,6
57	187,01	105	344,49	450	1476,4
58	190,29	110	360,90	460	1509,3
59	193,57	115	377,30	470	1542,1
60	196,85	120	393,71	480	1574,9
61	200,13	125	410,11	490	1607,7
62	203,42	130	426,52	500	1640,4
63	206,70	135	442,92	600	1968,5
64	209,98	140	459,33	700	2296,6
65	213,26	145	475,73	800	2624,7
66	216,54	150	492.13	900	2952,8
67	219,82	155	508,54	1000	3280,9
68	223,10	160	524,94	2000	6561,8
69	226,38	165	541,35	3000	9842,7
70	229,66	170	557,75	4000	13124
71	232,94	175	574,16	5000	16404

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APPENDICE

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CORRECÇÃO

DE

ALTURAS OBSERVADAS

EXEMPLOS

Altura do Sol

Em 20 de janeiro de 1890 observou-se a altura do limbo inferior do Sol, observador ao S., por 30° 25′ 30″. Erro do instrumento — 1′ 42″. Elevação do observador 5m.5. Pede-se a altura verdadeira.

Altura observada	30° 25′ 30″
Erro do instrumento	— 1 42
	30° 23′ 48″
Depressão (T. 4), (5m.5)	— 4 09
	30° 19′ 39″
½ diametro (A. N., pag. II)	+ 16 17
Altura apparente (centro)	30° 35′ 56″
Refracção (T. 3)	— 1 38
	30° 34′ 18″
Parallaxe em altura (T. 6)	+ 8
Altura verdadeira	30° 34′ 26″

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ou: Altura observada	30° 25′ 30″
Erro do instrumento	— 1 42
	30° 23′ 48″
Correcção (T. 10)	+ 10 36
Altura verdadeira	30° 34′ 24″

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Altura da Lua

Em 28 de agosto de 1890 (a. m.), na latitude 46° S., e longitude 150° E., observou-se a altura do limbo inferior da Lua, observador ao S., por 32° 48′ (sem erro no instrumento). A hora do chronometro, correcta do estado e marcha, era $3^h\ 01^m\ 00^s$, e a elevação do observador $6^m.1$. Pede-se a altura verdadeira.

Correcção do ½ diametro (A. N., pag. III):

Em 27 de agosto, meio dia	16′ 34.0″
Em 27 de agosto, meia noite ..	16 38.0
	4.0″
	3^h
	$\frac{12}{12} = 1''$
	16′ 34.0″
	+ 1
	16′ 35.0″
Augmento (T. 7)	+ 9.6
½ diametro, correcção.....	16′ 44.6″

Correcção da parallaxe (A. N., pag. III):

Em 27 de agosto, meio dia ...	60′ 41.9″
Em 27 de agosto, meia noite..	60 56.3
	14.4″
	3^h
	$\frac{43.2''}{12} = 3.6''$
	60′ 41.9″
	+ 3.6
	60′ 45.5″
Diminuição (T. 8)	— 6.3
Parallaxe horizontal correcta..	60′ 39.2″

Altura observada, limbo superior ☾	32° 48′ 00″
Depressão (T. 4), ($6^m.1$)	— 4 23
	32° 43′ 37″
½ diametro.....	— 16 45
Altura apparente (centro).....	32° 26′ 52″
Refracção (T. 3)	— 1 30
	32° 25′ 22″
Parallaxe em altura.....	+ 51 12
	33° 16′ 34″

Parallaxe em altura:

Parallaxe horizontal correcta..	60′ 39″ = 3639″
T. Y) log. 3639.....	4390
T. X) log. 32° 25′ 20″.....	2275
log. aux.....	2115

6144
3072″ = 51′ 12″

Altura de um Planeta

Em 8 de outubro de 1890 observou-se a altura do limbo inferior de Venus por 56° 20′, estando o observador a N. do planeta. Erro do instrumento — 3′ 40″. Elevação do observador $6^m.4$.

Pede-se a altura verdadeira.

½ diametro 15″ Parallaxe horizontal 16″

Altura observada.....	56° 20′ 00″
Erro do instrumento.....	— 3 40
	56° 16′ 20″
Depressão (T. 4), ($6^m.4$)	— 4 29
	56° 11′ 51″
½ diametro.....	+ 15
Altura apparente (centro).....	56° 12′ 06″
Refracção (T. 3)	— 0 39
	56° 11′ 27″
Parallaxe em altura (T. 9).....	+ 9
Altura verdadeira.....	56° 11′ 36″

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Altura de uma Estrella

Em 10 de fevereiro de 1890 a altura de Procyon (α Canis minoris) foi 28° 30′, observador ao N. Erro do instrumento + 2′ 25″. Elevação do observador $6^m.1$.

Pede-se a altura verdadeira.

Altura observada	28° 30′ 00″
Erro do instrumento	+ 2 25
	28° 32′ 25″
Depressão (T. 4), ($6^m.1$)	— 4 23
	28° 28′ 02″
Refracção (T. 3)	— 1 47
Altura verdadeira	28° 26′ 15″

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ou: Altura observada	28° 32′ 25″
Correcção (T. 21)	— 6 12
Altura verdadeira	28° 26′ 13″

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Ponto ao meio dia por duas alturas do Sol, sendo uma meridiana (S. Hilaire)

Elementos do calculo

Data	26 de junho de 1890 (7^h a. m.)
Lat. est.	10° 36′ S.
Long. est.	18 00 W. = 1^h 12^m 00^s
H. m. G.	20^h 32^m 15^s
Alt. verd.	13° 27′ 58″
Lat. merid.	10 45 00 S.
Decl. corr.	23 22 22 N.
Eqt.	+ 2^m 31^s

Entre as observações, 24 milhas percorridas a 67° 5′ SE. verdadeiro.

Calculo do Angulo no Polo (P)

H. m. G.	20^h 32^m 15^s
Long. (tempo)	— 1 12 00
H. m. b.	19^h 20^m 15^s
Eqt.	— 2 31
H. v. b.	19^h 17^m 44^s
P	4 42 16

Calculo da Altura (A′)

Lt. 10° 36′ S.		2935	
Dc. 23 22 N.		2639	
		5574	
	log. P	7777	
	log. aux.	2203	6022
33° 58′			3293
			2729

Calculo do Azimuth

T. 13	+ 0.07
T. 13-a	+ 0.46
Corr.	+ 0.53

T. 14 Az = N. 62° 5′ E.

Entre a 1.ª e 2.ª observações

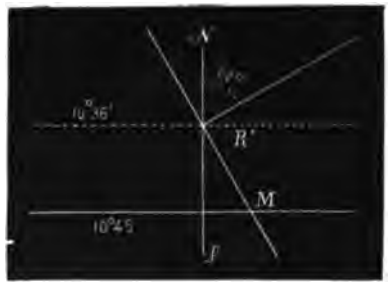
A′ = 13° 08′
A = 13 28

(a) A − A′ = + 20′

(a) A differença de alturas é marcada na direcção azimuthal, a partir do ponto, para o lado do Sol ou para o opposto, segundo tiver o signal + ou —, e o azimuth é considerado rumo. Estimando estes elementos, os resultados applicam-se ao ponto estimado.

R) Ponto rectificado ou approximado á hora da 1.ª observação.....	Lat. est...	10° 36′ 00″ S.		Long. est.	18° 00′ 00″ W.	
		9 12 : N.			18 00 : E.	
		10° 26′ 48″ S.			17° 42′ 00″ W.	
R′) Ponto transportado ou approximado á hora da 2.ª observação.....		9 12 : S.			22 30 : E.	
		10° 36′ 00″ S.			17° 19′ 30″ W.	
	Lat. merid.	10 45 00 S.		(b) 9×0.53 =	4 46 : E.	
	Diff. lat....	9′ 00″ : S.				
M) Ponto exacto ao meio dia.....	Lat.....	10° 45 00 S.		Long. ...	17° 14′ 44″ W.	

(c)



(b) Como os dois pontos R' e M estão na mesma recta de altura, a diff. long. = diff. lat. × corr. O sentido da diff. long. acha se, escrevendo a denominação do azimuth, e por baixo a do quadrante opposto, e no quadrado das quatro letras, traçar a diagonal a partir da letra que indica o sentido da latitude. A letra opposta será o sentido da correcção á longitude. Assim, para o presente ex., $\begin{matrix}\text{N.}\\ \text{S.}\end{matrix} \nearrow \begin{matrix}\text{E.}\\ \text{W.}\end{matrix}$. A diff. de long. 4′ 46″ será para E.

(c) O traçado graphico é para verificação, mas não se torna necessario no correr do calculo.

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Ponto por duas alturas do Sol, sendo uma meridiana

Elementos

Data	19 de maio de 1890 (p. m.)
Lat. est	41° 54′ N.
Long. est	56 00 W.
Alt. verd	44 07
Decl. corr	19 53 N.
Lat. merid	41 31 N.
H. do chronometro (H. m. Gr.)	6ʰ 54ᵐ 01ˢ
Eqt. á H. Gr.	— 3 44

Entre as observações 28′ a NW. 4 W. verdadeiro.

Longitude

A.	44° 07′	8039	
Lt.	41 54 N.		1728
Dc.	19 53 N.		2743
	22° 01′	4271	
		2310	6364
			1.0835

$\mathcal{P} = \mathcal{H}$	= 3ʰ 11ᵐ 44ˢ = 47° 56′
90° — P	42 04
Eqt	— 3 44
H. m. b.	3ʰ 08ᵐ 00ˢ
H. m. Gr.	6 54 01
Long. (tempo)	3ʰ 46ᵐ 01ˢ
Long.	56° 30′ 15″ W.

Variação do Angulo no Polo e Azimuth
(nota *g*)

90° — P	1716	Const.	0.3010	
φ	1728	90° — s	3010	
	3444		0.6020	
	6020			
	9.7424	1.810		— 0.810
90° — P	1716	Const.	0.3010	
δ	2743	90° — δ	9.8326	
	4459	(α)	1336	
	1336			
	3123			+ 0.487
		Corr.		— 0.323

(α)	4459
A	1571
	2888

90° — z = 13° 32′
z = S. 76 28 W.

Entre as observações

28′ a NW. 4 W. verdadeiro

Diff. de latitudes	23′,3
Ap.	15 6
Diff. de longitudes	21 0

Ponto á hora da 2.ª observação

Lat. merid.	41° 31′	N.
Diff. : N.	23 18″	
Lat.	41° 54′ 18″	N.
Long.	56 30 15	W.

Ponto ao meio dia

Long.	56° 30′ 15″	W.
Corr. : E.	— 7 30	
Long.	56° 22′ 45″	W.
Lat.	41 31 00	N.

$$23{,}3 \times 0{,}32 = 7'{,}5 \; \begin{matrix}\text{N.}\\ \text{S.}\end{matrix} \nearrow \begin{matrix}\text{E.}\\ \text{W.}\end{matrix}$$

N. B. Este calculo poderia ser simplificado, calculando-se apenas a longitude, azimuth e a estima no intervallo das observações.

A correcção da longitude seria dada pela propria estima com a differença de latitudes 23.3′ e o rumo 90° — z, o que daria para differença de longitudes 7.5′.

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Ponto por duas alturas em tempos differentes

DADOS DO CALCULO

8 de novembro de 1890

1.ª observação		2.ª observação	
H. da obs.	10 h. (a. m.)	H. da obs.	3 h. (p. m.)
Lat. est.	49° 30′ 00″ N.		
Long. est.	8 05 00 W.		
Alt. verd.	22 03 21	Alt. verd.	14° 40′ 39″
H. m. Gr.	22ʰ 40ᵐ 03ˢ	H. m. Gr.	3ʰ 08ᵐ 05ˢ
Decl. corr.	15° 07′ 52″ S.	Decl. corr.	15° 11′ 21″ S.
Eqt.	— 16ᵐ 21ˢ	Eqt.	— 16ᵐ 21ˢ

Entre a 1.ª e 2.ª observações 32 milhas percorridas a 67° SE. verdadeiro.

Calculo das longitudes

1.ª observação				2.ª observação			
A.	22° 03′ 21″	1245		A.	14° 40′ 39″	2466	
Lt.	49 30 00 N.		1136	Lt.	49 17 30 N.		1154
Dc.	15 07 52 S.		2857	Dc.	15 11 21 S.		2856
D.	64° 37′ 52″	9285		D.	64° 28′ 51″	9308	
		0530	1.2757			1774	7510
			1.6750				1.1520

Lat. est. .... 49° 30′ 00″ N.
12 30 : S.
49° 17′ 30″ N.

		Azimuth			Azimuth
♃	1ʰ 34ᵐ 52ˢ	T. 13 + 2.66	♃	2ʰ 56ᵐ 24ˢ	T. 13 — 1.21
♃	22 25 08	T. 13-a + 0.67	Eqt.	— 16 21	T. 13-a — 0.39
Eqt.	— 16 21			2ʰ 40ᵐ 03ˢ	Corr. — 1.60
H. m. b.	22ʰ 08ᵐ 47ˢ	Corr. + 3.33		3 08 05	
H. m. Gr.	22 40 03				
	31ᵐ 16ˢ	T. 14 Az = S. 25 E.		28ᵐ 02ˢ	T. 14 Az = S. 44 W.

Long.	7° 49′ 00″ W.	Long.	7° 00′ 30″ W.	
	45 00 : E.			
(*t*) Long.	7° 04′ 00″ W.	Lat.	49° 17′ 30″ N.	Ponto transportado para a hora da 2.ª observação.
(*m*) Long.	7 00 30 W.	Lat.	49 17 30	Ponto de intersecção da 2.ª recta de altura com o parallelo da latitude do ponto transportado.

Long.	7° 04′ 00″ W.	Correcção	3.33
Long.	7 00 30	Correcção	1.60
(*a*)	3′ 30″	Correcções	4.93

$$\frac{3.5}{4.93} = 0.7 \qquad 3.33 \times 0.7 = 2.33 \qquad 1.60 \times 0.7 = 1.12$$

		7° 04′ 00″ S. ∧ E. N. ∧ W.	7° 00′ 30″ S. ∧ W. N. ∧ E.
Lat.	49° 17′ 30″ N.	— 2 20	+ 1 07
	42 : N.	7° 01′ 40″	7° 01′ 37″

Ponto exacto á hora da 2.ª observação Lat. 49° 18′ 12″ N. Long. 7° 01′ 38″ W.

Este traçado servirá, quando muito, para verificação, mas é dispensavel no correr do calculo.

(*a*) A latitude no cruzamento das rectas de altura é dada pela formula

$$\text{diff. lat.} = \frac{\text{diff. long.}}{\text{Somma ou differença arithmetica das correcções}}$$

1.° Se a correcção correspondente ao azimuth mais W. tiver o signal +, a differença de latitudes será para N., nas latitudes N., e para S. nas latitudes S. Se tiver o signal —, a differença será para S. nas latitudes N., e para N. nas latitudes S., o que quer dizer que as latitudes crescem com a correcção positiva, e decrescem com a negativa.

2.° Se as correcções tiverem o mesmo signal, o ponto de cruzamento sae fóra dos limites das longitudes. É o caso da differença arithmetica, a que se refere a formula.

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Ponto por duas alturas em tempos differentes (S. Hilaire)

DADOS DO CALCULO

8 de novembro de 1890

1.ª observação (10 h. a. m.)		2.ª observação (3 h. p. m.)	
Lat. est.	49° 30′ 00″ N.		
Long. est.	8 05 00		
H. m. Gr.	22ʰ 40ᵐ 03ˢ	H. m. Gr.	3ʰ 08ᵐ 05ˢ
Alt. verd.	22° 03′ 21″	Alt. verd.	14° 40′ 39″
Decl. corr.	15 07 52 S.	Decl. corr.	15 11 21 S.
Eqt.	— 16ᵐ 21ˢ	Eqt.	— 16ᵐ 21ˢ

Entre a 1.ª e 2.ª observações 32 milhas percorridas a 62° SE. verdadeiro.

Calculo do Angulo horario

H. m. Gr.	22ʰ 40ᵐ 03ˢ	H. m. Gr.	3ʰ 08ᵐ 05ˢ
Long. (tempo)	— 0 32 20	Long. (tempo)	— 0 29 09
H. m. b.	22ʰ 07ᵐ 43ˢ	H. m. b.	2ʰ 38ᵐ 56ˢ
Eqt.	+ 16 21	Eqt.	+ 16 21
H. v. b.	22ʰ 24ᵐ 04ˢ	AH	2ʰ 55ᵐ 17ˢ
AH	1 35 56		

Calculo do azimuth

T. 13	+ 2.67	T. 13	— 1.21
T. 13-a	+ 0.67	T. 13-a	— 0.39
Corr.	+ 3.34	Corr.	— 1.60
T. 14 Az = S. 25° E.		T. 14 Az = S. 44° W.	

Calculo da altura (A′)

Lt. 49° 30′	1136	Lt. 49° 13′ 36″ N.	1160
Dc. 15 08	2857	Dc. 15 11 21 S.	2856
	3993		4016
log. AH	1.6658	log. AH	1.1573
log. aux.	1.2665 0541	log. aux.	7557 1755
64° 38′	9284	64° 24′ 57″	9318
	1257		2437

A′ = 21° 59′ 00″	A′ = 14° 51′ 00″
A = 22 03 21	A = 14 40 39
A — A′ = + 4′ 21″ = 4.3′	A — A′ = — 10′ 21″ = — 10.3′

[redacted] [redacted]

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(*e*) Lat. est. 49° 30′ 00″ N. Long. est. 8° 05′ 00″ W. Lat. 49° 13′ 36″ N. Long. 7° 17′ 12″ W.
3 54 : S. 2 48 : E. 7 24 : N. 10 54 : E.

(*r*) Lat. ... 49° 26′ 06″ N. Long..... 8° 02′ 12″ W. (*r′*) Lat. 49° 21′ 00″ N. Long. 7° 06′ 18″ W.
12 30 : S. 45 00 : E. 7.4 × 1.60 = 11 48 : E.

(*t*) Lat. ... 49° 13′ 36″ N. Long..... 7° 17′ 12″ W. S. ≺ W. N. ≺ E. Long. 6° 54′ 30″ W.
Long..... 6 54 30 W. (*m*) Lat. 49° 13′ 36″ N. Long. 6 54 30 W.

22′ 42″

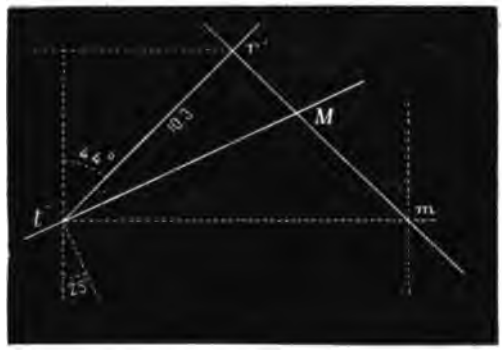
3.34
1.60 — 22.7 = 4.6
4.94 — 4.94

4.6 × 3.34 = 15.3
4.6 × 1.60 = 7.4

7° 17′ 12″ S. ≺ E. 6° 54′ 30″ S. ≺ W.
− 15 18 N. ≺ W. + 7 24 N. ≺ E.
7° 01′ 54″ 7° 01′ 54″

Lat. .... 49° 13′ 36″ N.
4 36 N.

(*M*) Lat..... 49° 18′ 12″ N. Long. 7° 01′ 54″ W.



(*e*) Ponto estimado.
(*r*) Ponto rectificado á hora da 1.ª observação.
(*t*) Ponto transportado para a hora da 2.ª observação.
(*r′*) Ponto rectificado á hora da 2.ª observação.
(*m*) Ponto de intersecção da 2.ª recta de altura com o parallelo do ponto transportado
(*M*) Ponto exacto á hora da 2.ª observação.

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Ponto por duas alturas simultaneas

6 de dezembro de 1890 (6 horas e 30 minutos a. m.)

Elementos do calculo

Latitude estimada	49° 58′	N.
Longitude estimada	14 30	W.
H. m. Gr.	19h 30m 20s	
Altura verdadeira (Regulus, α Leonis)	48° 35′ 42″	(W. do Merid.)
Altura verdadeira (Arcturus, α Bootis)	46 26 36	(E. do Merid.)
Declinação correcta (Regulus)	12 30 05	N.
Declinação correcta (Arcturus)	19 45 05	N.
Æ (Regulus)	10h 02m 33s	
Æ (Arcturus)	14 10 39	

Calculo da hora sideral em Greenwich

Hora sideral (A. N., pag. II)	16h 56m 57s
Acc. (A. N., pag. 486)	3 12
H. m. Gr.	19 30 20
H. s. Gr.	12h 30m 29s

Calculo das longitudes

Regulus

A.	48° 35′ 42″	7500	
Lt.	49 58 00 N.		1094
Dc.	12 30 05		2906
D.	37° 27′ 55″	2937	
		0437	1.3595
			1.7595

Æ	1h 26m 00s
Æ	10 02 33
H. s. b.	11h 28m 33s
H. s. Gr.	12 30 29
	1h 01m 56s

Long. 15° 29′ W.

Arcturus

A.	46° 26′ 36″	7753	
Lt.	49 58 00 N.		1094
Dc.	19 45 05 N.		2747
D.	30° 12′ 55″	3641	
		1394	855[illegible]
			1.239[illegible]

Æ	2h 38m 41s
P	21 21 19
Æ	14 10 39
H. s. b.	11h 31m 58s
H. s. Gr.	12 30 29
	0h 58m 31s

Long. 14° 37′ 45″ W.

Azimuth

T. 13	— 3.04
T. 13-a	+ 0.61
Correcção	— 2.43
T. 14	S. 33 W.

Azimuth

T. 13	+ 1.44
T. 13-a	— 0.57
Correcção	+ 0.87
T. 14	S. 61 E.

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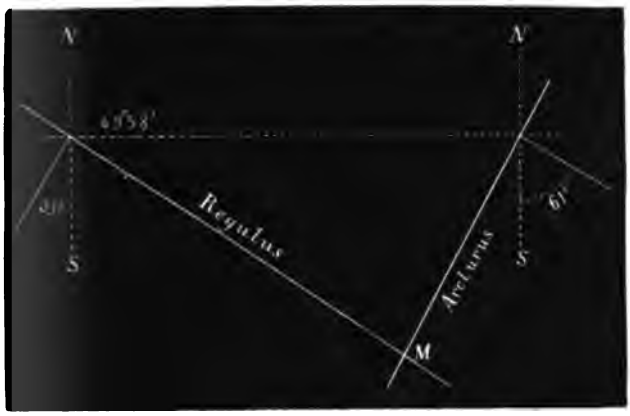

Long.	15° 29′ 00″	Corr.	2.43
»	14 37 45	»	0.87
Diff.	51′ 15″ = 51.25′		3.30

$$\frac{51.25'}{3.30} = 15.5'$$

Lat. N.	49° 58′ 00″
	15 30 : S.
(M) Lat.	49° 42′ 30″ N.

$15.5 \times 2.43 = 37.7$
$15.5 \times 0.87 = 13.5$

S. ↘ W.	15° 29′ 00″ W.	S. ↘ E.	14° 37′ 45″ W.
N. ↖ E.	37 42 : E.	N. ↖ W.	13 30 : W.
	14° 51′ 18″ W.		14° 51′ 15″

(M) Long. 14° 51′ 16″ W.

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NOTAS

(*a*) *Calculo da declinação* (pag. X e XI).

Diz-se no preambulo d'este calculo, que o problema é pouco praticavel, pela razão de não se descobrir á simples inspecção qual o signal que lhe pertence.

Um calculo previo e subordinado ás regras seguintes conduz á sua determinação:

1.º Faz-se a somma dos logarithmos de latitude e altura, tomados na Taboa X, col. $\frac{L.}{Dc.}$, subtrahindo-a do logarithmo do azimuth, referido ao polo do observador, tomado na Taboa Z;

2.º Ao resultado junta-se o logarithmo da differença entre latitude e altura, tomado na Taboa X, col $\frac{L.}{Dc.}$;

3.º Se a somma for maior que 3010, latitude e declinação teem o mesmo nome; se for menor, teem aquelles elementos nomes differentes.

Conhecido previamente o signal da declinação, vê-se logo em que circumstancias para a determinação d'esta se deve fazer a somma ou a differença entre latitude e altura, devendo intervir no calculo o logarithmo do azimuth referido ao polo da declinação.

(*b*) *Calculo da latitude por uma altura circummeridiana* (pag. XI e XII).

O caso ordinario é a observação ser feita acima do polo; mas quando é abaixo, a regra soffre apenas a modificação de sommar-se o numero dado pela Taboa Y com o valor correspondente á altura tomado na Taboa X, col. A; procedendo-se no resto como foi dito.

(*c*) *Distancia orthodromica* (pag. XIII).

N'este problema a distancia a calcular pode ser maior ou menor que 90°.

Seja P a differença de longitudes ou angulo no polo e D a distancia orthodromica.

D será $< 90°$, quando nas latitudes extremas do mesmo nome P fôr $< 90°$, e D $> 90°$ quando P $> 90°$ nas latitudes extremas de nomes differentes.

Alem d'estes dois casos perfeitamente accentuados ha P $> 90°$ nas latitudes extremas do mesmo nome, e P $< 90°$ nas de nomes differentes, para os quaes o valor de D será $<$ ou $> 90°$, se se der ou não a seguinte condição de facil inspecção

$$\log. d + \log. aux. > 3010$$

sendo d a differença ou somma das latitudes, quando do mesmo ou differente nome, cujo logarithmo é dado pela Taboa X, col. $\frac{L.}{Dc.}$. Alem do meio indicado para se reconhecer se D é $<$ ou $> 90°$; pode-se tambem recorrer á Taboa 21, onde se entra com uma das colatitudes como θ, e 90°—P ou P—90° como argumento horisontal.

Se o arco no cruzamento fôr maior ou menor que a outra latitude, D será $<$ ou $> 90°$, quando P $< 90°$ e $>$ ou $< 90°$ quando P $> 90°$

O primeiro processo é comtudo mais expedito.

Em seguida á determinação do logarithmo auxiliar, é de rigor saber se D $<$ ou $> 90°$.

N'este ultimo caso os signaes do numero correspondente ao logarithmo auxiliar, e valor de d (differença ou somma de latitudes) são invertidos, isto é, em vez de no calculo, conforme a regra, se subtrahir o primeiro do segundo, subtrahe-se o segundo do primeiro.

O valor de D será então o supplemento para 180° do arco final dado pela Taboa X, col. D.

Quando d (somma das latitudes) exceder 90° o elemento do calculo com que se entra na Taboa X, col. D é 180° — d.

(*d*) *Rumo inicial* (pag. XIII e XIV).

Por analogia com as regras para o calculo do azimuth, o rumo é contado do polo da chegada, assim como aquelle é contado do polo da declinação.

Para E. ou W. conforme a partida estiver mais a W. ou mais a E. do que a chegada.

A seguinte relação, em que apenas se faz uso da Taboa X, col. $\frac{L.}{Dc.}$, póde tambem dar o valor do rumo:

$$\log. (90° - P) + \log. \varphi' - \log. (90° - D) = \log. (90° - R)$$

sendo P angulo no polo ou differença de longitudes, φ' latitude da chegada, D distancia orthodromica e R rumo.

Este denominar-se-ha, como no caso usual, do polo da chegada, para E. ou W., conforme a posição da partida em relação á da chegada. Somente no caso de latitudes do mesmo nome, sendo a da chegada menor que a da partida, o rumo será o supplemento para 180° do valor de R, quando 90° — D for maior que a altura da Taboa 12 correspondente á latitude e declinação, de valores eguaes aos das latitudes de partida e chegada.

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(*e*) *Calculo das coordenadas dos differentes pontos de um arco de circulo maximo* (pag. XIV e XV).

N'este problema não é de rigor, para o conhecimento das coordenadas intermedias, calcular o rumo terminal, como assim se chama o do ponto de chegada.

Se se considera como ponto de partida, para a determinação das referidas coordenadas, o ponto mais afastado do equador no arco de latitudes extremas do mesmo nome, o valor de P' será differente do que resulta quando o mesmo ponto de partida for o mais proximo, e por consequencia differente em ambos os casos o valor de P.

No primeiro será $P = P' - p$, no segundo $P = P' + p$, como succede no calculo a pag. XV e XVI.

No arco de latitudes extremas de nomes differentes o valor de P é egual a $P' - p$ ou $p - P'$, segundo que a latitude a achar é do mesmo ou de nome differente do da latitude da partida.

O valor de P' é pois dependente do rumo no ponto escolhido para ponto de partida, e é indifferente para isso escolher um ou outro dos pontos extremos do arco.

(*f*) *Circumstancias favoraveis para a determinação da Hora* (pag. XXVIII e XXIX).

Calculo do Angulo Horario e Altura

1.º Tomam-se da Taboa X, col. $\frac{L}{Lc}$, os logarithmos da distancia polar e colatitude; subtrahe-se o logarithmo do menor arco do logarithmo do maior, e junta-se á differença 3010;

2.º Entra-se com o resultado na mesma taboa; esta dá a distancia zenithal, e d'ahi deduz-se a altura;

3.º Tomam-se da mesma taboa os logarithmos da altura e o da declinação ou latitude (o do menor arco); subtrahe-se o segundo do primeiro, e junta-se á differença 3010;

4.º Entra-se com o resultado na taboa; esta dá 90° — P (sendo P o angulo no Polo); d'ahi se deduz P, ou o angulo horario pela conversão do arco em tempo.

EXEMPLO

Lat. 27°	Colat. 63°.....	9.9581
Decl. 40	D. polar 50.....	1091
		9.8490
		1500

Dz = 45° 04'
A = 44 56

A = 44° 56'.....	1510
Lat. 27 00.....	2509
	9.9001
	2011

90° — P = 37° 24'
P = 52 36
⌚ = 3h 30m

Esta hora está subordinada ás condições expendidas na citada pag. XXVIII.

(*g*) *Variação do angulo no Polo* (pag. XXX).

Esta variação ou correcção póde, á falta das respectivas taboas, ser calculada pelas Taboas X, col. $\frac{L}{Lc}$, e Y.

1.º Da somma dos logarithmos de 90° — P e latitude subtrahe-se a somma da constante 0.3010 com o logarithmo de 90° — s ou s — 90°, sendo s a somma de latitude e angulo no Polo.

O resultado tem sempre o indice ou caracteristica 9.

2.º Entra-se na Taboa Y com a parte decimal do logarithmo, tomando o numero correspondente, separando o ultimo algarismo da esquerda, e subtrahindo a este uma unidade.

Quando fique parte inteira, esta representará minutos e os restantes algarismos decimaes de minuto. Quando o angulo no Polo for maior que 90°, intervem no calculo o supplemento para 180°.

A correcção terá o signal + ou —, segundo que o astro foi observado a E. ou W., para um dado angulo no polo < 90°, e quando > 90°, os signaes são invertidos na referida alternativa.

Esta é a correcção correspondente á que dá a Taboa 13.

A da Taboa 13-a obtem-se:

1.º Subtrahe-se a somma da constante 0.3010 com o logarithmo do complemento da declinação da somma dos logarithmos de 90° — P e declinação.

2.º Entra-se na Taboa Y com a parte decimal do resultado, toma-se o numero correspondente, do qual se separará o ultimo algarismo da esquerda, quando haja caracteristica no logarithmo.

A correcção terá o signal — ou + quando nas latitudes e declinações do mesmo nome a observação foi feita a E. ou W., e os signaes trocados e na mesma alternativa nas latitudes e declinações de nomes oppostos.

A somma algebrica das duas correcções é a variação do angulo no Polo pela mudança de um minuto na latitude.

EXEMPLO

A.	62° 43′ (E.)	6112		
Lt.	21 40 S.		2692	
Dc.	13 14 S.		2893	
	8° 26′	4892		
		1004	9983	
			1.5568	

Æ ou P = 1ʰ 49ᵐ
= 27° 15′
90° — P = 62 45
s = 48 55
90° — s = 41 05

90° — P	9.9618	Const...	0.3010	
Lt.	2692	90° — s..	1783	
	2310		4793	
	4793			
Num. correspondente ao log. aux.	9.7517		1771	
		Corr.		+ 0.771′
90° — P	9.9618	Const...	0.3010	
Dc.	2893	90° — Dc.	9.6607	
	2511	(α)	9.9617	
	9.9617			
Num. correspondente ao log. aux.	2894		5136	
		Corr.		— 0.514
Variação ou somma algebrica das correcções				0.257′
			ou	0.26′

Azimuth (z)

Se da somma (α) se subtrahir o logarithmo da altura (A), obtem-se, entrando com o resultado na Taboa X, col. $\frac{Lt.}{he.}$, o valor de 90° — z, de onde se deduzirá o azimuth que, conforme for positiva ou negativa a correcção, será contado do polo inferior ou superior, quando o astro a E., e do superior ou inferior, quando a W.

Assim, tomando o exemplo antecedente

90° — P...	9.9618	
Dc.	2893	
	2511	(α)
A.	9.9623	
	2888	

90° — z = 13° 33′
z = N. 76 27 E.

Independentemente do conhecimento da correcção, o azimuth denomina-se do polo da declinação, e para E. ou W., conforme a altura augmenta ou diminue.

Somente no caso de latitude e declinação do mesmo nome, mas esta menor do que aquella, é que o azimuth é o supplemento para 180° do valor de z, e quando entrando na Taboa 12 com a dada latitude e declinação, a altura correspondente a estes dados for menor que a altura que intervem no calculo.

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(*h*) *Culminação dos Astros* (pag. XXXIV).

Calculo do coefficiente das circummeridianas

1.º Toma-se da Taboa X, col. $\frac{t}{bc}$, o logarithmo de 90º — d, sendo d a differença ou somma de latitude e declinação, conforme são do mesmo ou differente signal;

2.º Subtrahe-se d'este logarithmo a somma dos logarithmos de latitude e declinação, tomados da mesma taboa, e junta-se á differença a constante 0080;

3.º Com o resultado, do qual se abstrahe a caracteristica ou indice (9 ou 8), entra-se na Taboa Y, tomando d'ahi o numero correspondente, sendo o primeiro ou os dois primeiros algarismos, conforme o indice for 9 ou 8, segundos de grau, e os restantes partes decimaes do segundo.

EXEMPLOS

1.º

Lat. 30º Decl. 20º mesmo signal

	d = 10º			
90º — d	80		9.5407	
Lat.	30	2386		
Decl.	20	2740	5126	
			9.0281	
			0080	
Numero correspondente ao log. aux.			9.0361	9203

$\alpha = 9.2''$

2.º

Lat. 2º Decl. 8º signaes contrarios

	d = 10º			
90º — d	80		9.5407	
Lat.	2	3008		
Decl.	8	2968	5976	
			8.9431	
			0080	
Numero correspondente ao log. aux.			8.9511	1119

$\alpha = 11.2''$

(*i*) *Hora do Nascer e Pôr verdadeiro dos Astros* (pag. XXXV).

Resulta naturalmente este problema do calculo da hora a bordo, introduzindo-se-lhe a condição de ser nulla a altura verdadeira do Astro.

Obtem-se assim a hora do Nascer ou Pôr verdadeiro do mesmo Astro.

Deve previamente presumir-se a referida hora, passar d'esta para a do primeiro meridiano (Greenwich), para a qual se calcula a declinação e equação do tempo, determinar emfim o ponto estimado para a hora que se presumiu.

Na pratica é, sob todos os pontos de vista, preferivel o uso da Taboa 16.

(*k*) *Amplitudes* (pag. XXXVII).

Azimuth de um Astro no momento do Nascer ou Pôr verdadeiro

Como se sabe, a amplitude de um Astro é o complemento para 90º do azimuth no referido momento.

É calculado, fazendo-se uso da Taboa X, col. $\frac{t}{bc}$, subtrahindo o logarithmo da latitude do logarithmo da distancia polar, e juntando á differença 3010.

Entrando de novo com o resultado na taboa, esta dará o azimuth menor que 90º nas latitudes e declinações do mesmo nome, e maior que 90º (supplemento para 180º), quando de nomes differentes.

O azimuth será pois 90º — amplitude, no primeiro caso, e 90º + amplitude, no segundo.

A amplitude é contada do ponto E. ao Nascer e do W. ao Pôr; para N. ou S. conforme o nome da declinação.

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EXEMPLO

Decl. 20° N.	D. polar 70°	9.8351
Lat. 30 N.	.....	2386
		9.5965
		9.8975

z = N. 66° 44′ E.
Ampl. = E. 23 16 N.

Se a declinação fosse S., o azimuth seria

N. 113° 16′ E.

No entretanto na pratica é preferivel o uso da Taboa 17.

(*l*) *Correcção da declinação e ascensão recta do Sol ou Planeta para qualquer hora do 1.° meridiano (Greenwich).*

Tomam-se da Taboa Y os logarithmos da variação diaria ou mudança em 24 horas, e o da hora de Greenwich, que se sommam com a constante 7.3802.

Entrando com o resultado na taboa, esta dá o numero de minutos e decimos, que se applicam convenientemente á declinação ou ascensão recta.

EXEMPLO

Qual a ascensão recta e declinação de Venus em 10 de maio de 1890, ás 11h 48m (T. M. G.)?

Æ em 10.....	4h 33m 38s	Decl. em 10....	22° 36′ 08″ N.	
11.....	4 38 51	11....	22 49 01 N.	
	5m 13s		12′ 53″	
Var. 5.2m....		3.2840	12.9′	2.8894
H. G. 11.8h....		2.9281		2.9281
Const.....		7.3802		7.3802
		3.5923		3.1977
		2.557		6.343
		+ 2m 33s		+ 6′ 20″
		4h 33 38		22° 36 08
		Æ 4h 36m 11s	Decl. 22° 42′ 28″ N.	

Este processo de determinar a correcção, applica-se a qualquer outro elemento do *Almanach Nautico*, dado para o intervallo de 24 horas.

(*m*) *Correcção da ascensão recta e declinação da Lua para qualquer hora do 1.° meridiano (Greenwich).*

Tomam-se da Taboa Y o logarithmo da variação horaria ou mudança em 60 minutos, isto é, differença entre a ascensão recta ou declinação que precede e a que segue a hora de Greenwich e o logarithmo dos minutos e segundos d'esta hora, e sommam-se os dois logarithmos com a constante 7.7782.

A esta somma corresponde na mesma taboa o numero de minutos e decimos, que se applicam convenientemente á ascensão recta ou declinação que precede a hora de Greenwich.

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EXEMPLO

Qual a ascensão recta e declinação da Lua em 16 de março de 1890, ás $20^h\ 36^m\ 15^s$ (T. M.

☾ ⚭ ás 20^h.....	$20^h\ 47^m\ 59^s$		☾ Decl. ás 20^h...	$21^\circ\ 13'\ 10''$ S.	
21	20 50 32		21 ...	21 05 46 S.	
	$2^m\ 33^s$			$7'\ 24''$	
Var.	2.55^m	3.5935	7.4′	3.1308	
T. G. depois das 20^h....	36.25^m	2.4407		2.4407	
Const.....		7.7782		7.7782	
		3.8124		3.3497	
		1.540		4.470	
	+	$1^m\ 32^s$	—	$4'\ 28''$	
		20^h 47 59		21° 13 10	

Ás $20^h\ 36^m\ 15^s$ (T. M. G.) ☾ ⚭ = $20^h\ 49^m\ 31^s$ ☾ Decl. = $21^\circ\ 08'\ 42''$ S.

(*n*) *Calcular a hora da passagem meridiana da Lua sobre um dado meridiano.*

1.° Toma-se do *Almanach Nautico*, pag. IV, a hora da passagem meridiana (Upper), para a d data astronomica; faz-se a differença entre a referida hora e a do dia seguinte nas longitudes W., mesma differença com a do dia antecedente nas longitudes E.; e converte-se a longitude em ten

2.° Tomam-se da Taboa Y os logarithmos da differença das horas das passagens e o da lo tude, que se sommam com a constante 7.3802.

3.° A esta somma corresponde na mesma taboa um numero de minutos e decimos, que se s mam com a hora da passagem meridiana nas longitudes W. e se subtrahem nas longitudes E.

EXEMPLO

Qual a hora da passagem meridiana da Lua em 29 de janeiro de 1890, na longitude 82° 30′ V

Long. $82^\circ\ 30' = 5.5^h$

Janeiro 29	$7^h\ 26.7^m$	
» 30	8 13.9	
	47.2^m	2.3261
Long....	5.5^h	3.2596
Const.....		7.3802
		2.9659
		10.82
		10.8^m
		7^h 26.7
Hora da passagem meridiana no logar		$7^h\ 37.5^m$
Long.		5 30 W.
H. G. em janeiro 29		$13^h\ 07.5^m$

Este calculo applica-se egualmente aos Planetas que teem no *Almanach Nautico* a hora da s passagem meridiana.

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